INTERGRAPH®
Smart → 3D

Catalog
User's Guide
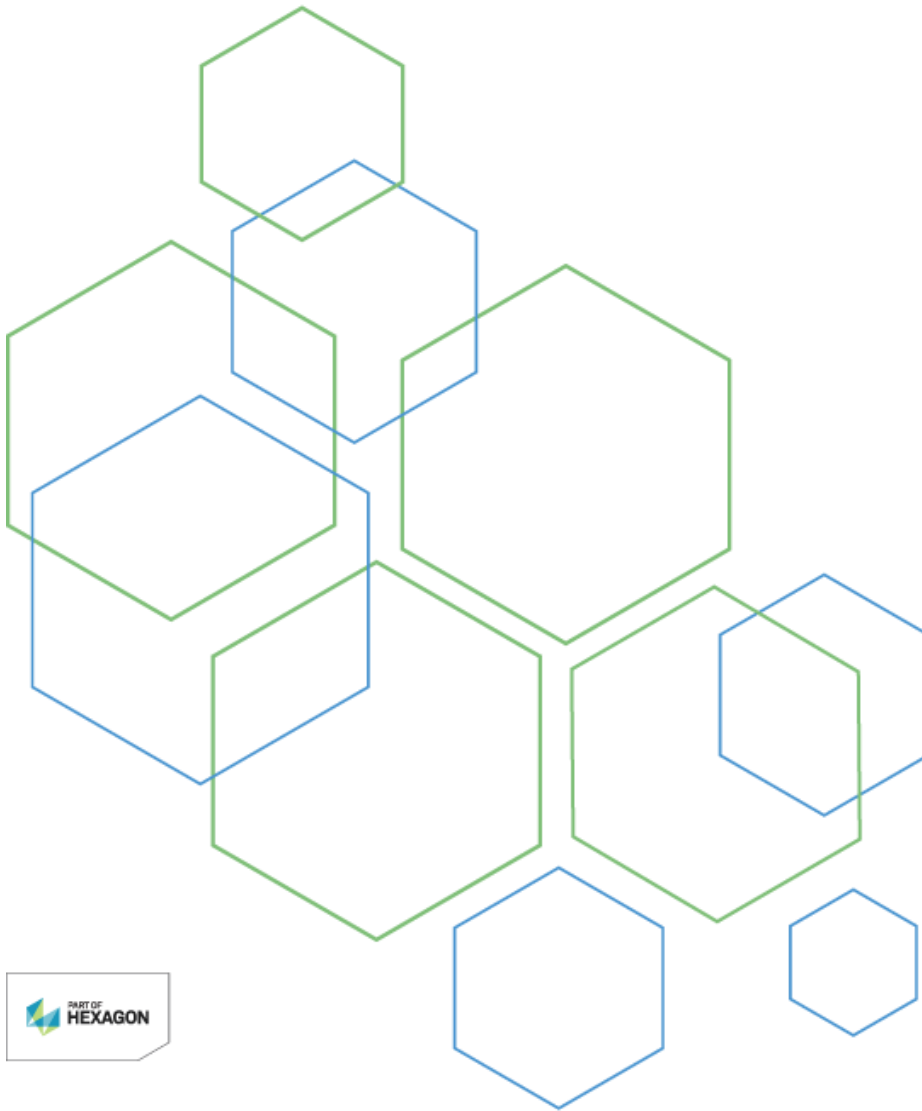
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Contents

Preface

This document is a user's guide for the Catalog functionality of Intergraph Smart™ 3D and provides command reference information and procedural instructions.

Documentation Comments

For the latest support information for this product, comments or suggestions about this documentation, and documentation updates for supported software versions, please visit *Intergraph Smart Support* (*https://smartsupport.intergraph.com*).

What's New in Catalog

The following changes have been made to the Catalog task:

Version 2016 (11.0)

- The **Plant Options** node is now renamed as **Model Options,** and the **Plant Rules** node as **Model Rules**. (P2 CP: 253832)

- Added the HSSCs and HSSRs member cross sections. These cross sections have a graphical representation for a seam. For more information, see *Cross Section Symbol HSSCs* (on page 631) or *Cross Section Symbol HSSRs* (on page 636). (P2 CP:261643)

- Added two new structure labels, **Structure Designed Member Computed Area** and **Structure Designed Member Computed SurfaceArea**. For more information, see *Structure Designed Member Computed Area* (on page 945) and *Structure Designed Member Computed SurfaceArea* (on page 945). (P2 CP:234498)

- You can now add a unit delimiter between primary and secondary units in a report label. You can also define a label with unit delimiter. For more information, see *Label Editor Command* (on page 256) and *Create a Label* (on page 264) (P2 CP:140982)

- Added clarification on how Smart 3D uses the **Automated Gasket Selection at Spec Break** rule and the **Gasket Selection for Mismatched Bolted Ends** option. For more information, see *Automated Gasket Selection at Spec Break Rule* (on page 452) and *Model Options* (on page 434). (P3 CP:260726)

- Best practice examples are now available to guide you through general Catalog processes. For more information, see *Appendix: Best Practices - Reference Data and Catalog Change Management* (on page 268). (P3 CP:260389)

- Clarified information on permission groups and the model and catalog databases. For more information, see *Controlling Catalog Access with Permission Groups* (on page 41). (P3 CP:265267)

- Added information in the **Managing Catalog Changes** workflow to clarify production and test catalog substitution. For more information, see *Managing Catalog Changes* (on page 43).

S ECTION 1

Catalog

Catalogs are reference databases that contain graphic and property information about the types of objects that you can place in your model. To use Intergraph Smart™ 3D to design process plants, ships, or offshore structures, you must have reference data. Reference data can be graphical or non-graphical in nature. For example, reference data includes graphical symbols that you can place in the model, such as equipment or piping components. Reference data also includes non-graphical, tabular data, such as specification data and rules. Reference data includes the parts that you place in the model, such as piping components and equipment. Specification data includes the rules that govern how those parts are placed and connected. The **Catalog** task allows you to view and edit this reference data. As in other Smart 3D environments, system administrators use permission groups to limit what users can and cannot do in terms of editing reference data. The information that appears in this task is pulled directly from the reference data in the Catalog database and is not affected by any filter you selected when you defined your workspace.

★ IMPORTANT

- In this release of the software, HVAC, Cables, Piping Manufacturing, Space Management, and Hangers and Supports reference data are read-only in the **Catalog** task. This reference data must be edited in the Microsoft Excel workbooks and bulk loaded into the catalog.

- Except for piping parts, piping specifications, piping rules, instruments, piping specialty data, conduit parts and specifications, cableway specifications, cabletray parts and specifications, there is no mechanism for exporting your reference data from the Catalog database back into a Microsoft Excel workbook. Consequently, if you intend to use the Bulkload Utility in tangent with the editing capabilities in the **Catalog** task, we recommend that you implement a workflow that keeps the data in the workbooks synchronized with the changes you make in the **Catalog** task. Place comments in the **Revision History** sheet of the workbook to track the changes that you make to a specific worksheet.

Under the reference data root, the database provides a high-level classification of the catalog (cables, piping, equipment, structure, and so forth). This catalog information is also user-customizable in terms of its data structure. You can organize the delivered reference data into groups in the way that makes sense for your company or project. For example, you can group the objects by type. These groups are often referred to as classes.

There are no software restrictions to prevent you from modifying a live catalog; however, we do not recommend this as you may be editing something that another user is accessing simultaneously. Ideally, all catalog changes should be made at the beginning of a project before modeling begins. Because this is not always possible, we recommend that you create a "live" and a "test" catalog database. You should make all changes in the test catalog and verify the changes in a test model. After the changes are verified, an administrator should select a convenient time to have all users stop modeling, create a backup, and then use copy and paste to move the changes from the test catalog to the live catalog. For more information, see *Managing Catalog Changes* (on page 43).

The Catalog environment consists of a left window that displays a tree view of classification folders. The right window displays details about the items or contents within the folder. The interaction between the classification and content views operates similar to that of **Windows Explorer**. For more information, see *Catalog Hierarchy* (on page 33).

You can start the **Catalog** task by clicking **Tasks > Catalog**. The **Catalog** task has these task-specific commands:

Save - Saves the active row to the Catalog database. For more information, see *Save Command* (on page 60).

Insert Row - Inserts a blank row into the grid view. For more information, see *Insert Row Command* (on page 60).

Move Up - Moves the select list entry up one in the editable grid. For more information, see *Move Up Command* (on page 60).

Move Down - Moves the select list entry down one in the editable grid. For more information, see *Move Down Command* (on page 61).

Properties - Displays the **Reference Data Properties** dialog box from which you can view standard and custom properties for the selected classification, part class or object in the Catalog database. For more information, see *Properties Command* (on page 61).

Preview - Opens a bitmap file that was assigned to a part or part class in the reference data. For more information, see *Preview Command* (on page 62).

Filter - Filter data in the content view to quickly find what you are looking for. For more information, see *Filter Command* (on page 63).

Sort - Sort data in the content view by multiple columns to quickly find what you are looking for. For more information, see *Sort Command* (on page 64).

Customize Current View - Control which property columns display in the content view and in what order. For more information, see *Customize Current View Command* (on page 65).

List View - Displays the information in the content view in a list format. For more information, see *List View Command* (on page 66).

Grid View - Displays the information in the content view in a table format. For more information, see *Grid View Command* (on page 67).

Back - Highlights the last selected item or folder. For more information, see *Back Command* (on page 68).

Forward - Advances the display forward to return the browser display to the last item that you selected before you used the **Back** command. For more information, see *Forward Command* (on page 68).

Up One Level - Moves the focus up one level in the Catalog hierarchy. For more information, see *Up One Level Command* (on page 69).

Check Data - Checks the consistency of the data in the grid against other data in the Catalog. For more information, see *Check Data Command* (on page 208).

Ignored Inconsistencies - Restores inconsistencies that have previously been ignored when using the **Check Data** command. For more information, see *Ignored Inconsistencies Command* (on page 211).

New Class - Creates new part classes in the Catalog hierarchy without having to bulkload. For more information, see *New Class* (on page 50).

New Item - Defines a new select list for use by the various Smart 3D environments. The **New Item** command is only available on the **Catalog** menu when the **Select List** folder is selected in the tree view. For more information, see *New Item Command* (on page 56).

New Folder - Creates a new folder in the Catalog hierarchy without having to bulkload. For more information, see *New Folder Command* (on page 56).

Verify Consistency Report - Compares piping specifications to Catalog data and verifies whether the piping commodities, piping specialties, and instruments in the Piping specification for a model are consistent with the data in the Catalog so that the required components can be created in the model. The **Verify Consistency Report** command is available only on the **Tools** menu. For more information, see *Verify Consistency Report Command* (on page 204).

Copy Filters from Catalog - Copies all filters from a user-specified Catalog database to the current active Catalog database. The **Copy Filters from Catalog** command is available only on the **Tools** menu. For more information, see *Copy Filters from Catalog Command* (on page 95).

Define Label - The **Define Label** command is only available on the **Tools** menu. For more information, see *Label Editor Command* (on page 256).

Import Branch Fittings - Creates and updates branch-fitting entries in the piping commodity filter. The **Import Branch Fittings** command is available only on the **Tools** menu when you have a piping commodity filter node selected. For more information, see *Import Branch Fittings Command* (on page 145).

Options - Sets system and user preference settings. The **Options** command is available only on the **Tools** menu. For more information, see *Options Command* (on page 56).

Add Range to Branch Table - Adds a new range of angles to the branch table. The **Add Range to Branch Table** command is available only on the **Tools** menu. For more information, see *Add Range to Branch Table Command* (on page 143).

Catalog Hierarchy

The Catalog environment consists of a left window (tree view) that displays a hierarchy of classification folders. The right window (content view) displays details about the items or

contents within the folder. You can also use the content view to add and edit reference data. For more information, see the *Editable Grid* (on page 37).
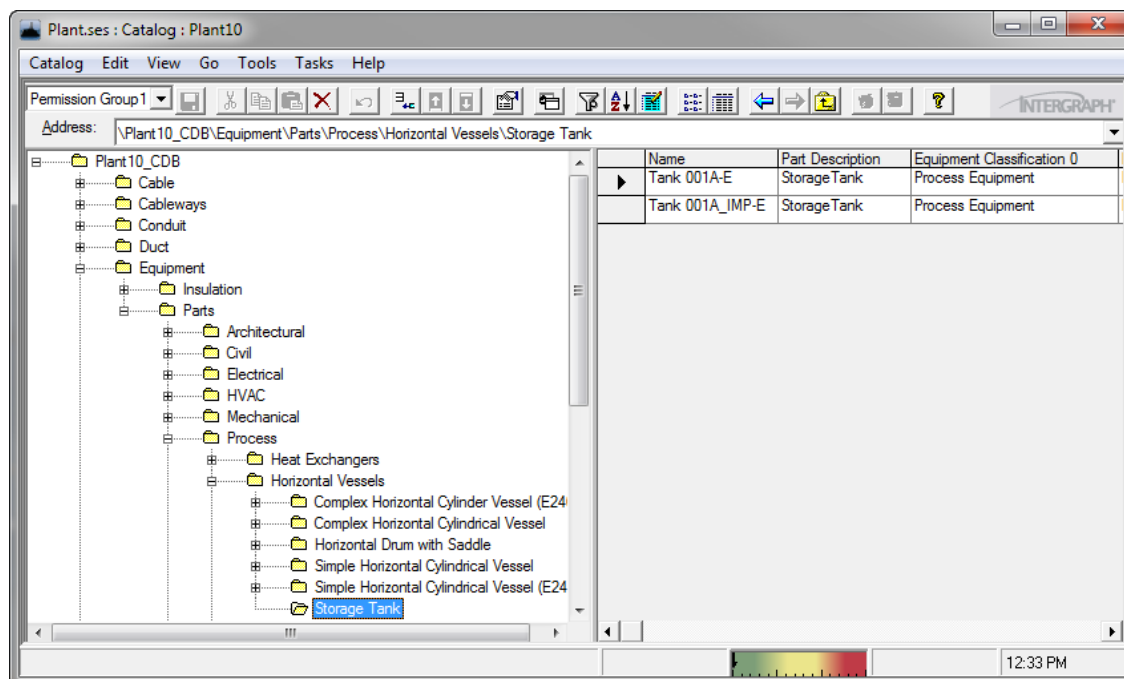
Tree View

In the left window, a tree view allows you to move through all the classifications stored in your Catalog database. This tree view contains several folders; at the top of the hierarchy is the root, or the Catalog database, for which you are viewing information. The catalog root is the highest allowable level in the hierarchy. The tree view is most useful for displaying relationships between the reference data.

Beneath the catalog, or reference database, root are standard discipline-specific folders, such as **Structure**, **Equipment**, and **Piping**. These folders are called hierarchy folders and work similarly to folders in Windows Explorer. Within each of these areas, a user (with the appropriate access permission) can create his or her own classification hierarchy for management of information.

A hierarchy folder does not contain any specific items, such as pieces of equipment. Instead, a hierarchy folder merely provides additional organization and categorization of the items within the discipline. Within the hierarchy folders are classification folders. In the following example, the

Structure > **Objects** folder contains classification folders such as **Footings**, **Handrails**, and **Ladders**
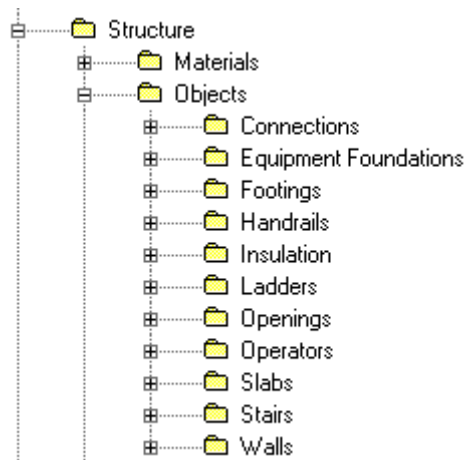
NOTES

- Most of the available roots are listed on the **CatalogRoot** sheet in the **AllCommon.xls** workbook. Some, such as Conduit, Reports, and Shapes, are listed in their individual workbooks.

- When selecting nodes in the Catalog hierarchy, the software displays only the immediate children of the selected folder, so objects located further down the Catalog hierarchy will not appear in the list view until their direct parent is selected.

Content View

Part classes exist within classification folders and contain objects from the Catalog database, such as pieces of equipment, piping components, features, cross sections, parts, and rules. Part classes are the lowest-level classification folders in the tree. Any properties associated with a class are associated with all objects in that class. Using commands on the **View** menu, you can toggle the content view between a standard list view and a standard grid view. The list view is always read-only; the grid view is editable. A third view option is available specifically for reviewing branch table data, reinforcing weld data, and reinforcing pad data in human specification format.

When you select a part class in the tree view, or left window, the objects contained within that class appear in the content view, or right window. Along with the name of the objects, this window also displays specifications about each object. The actual information that appears varies by class.

In the following illustration, **Mechanical** is a hierarchy folder. The item **Pumps** is a classification folder, and **Horizontal Centrifugal Pump** is a part class. The items listed in the content view

(right window) are the items that are defined in the reference data for the **Horizontal Centrifugal Pump** part class.
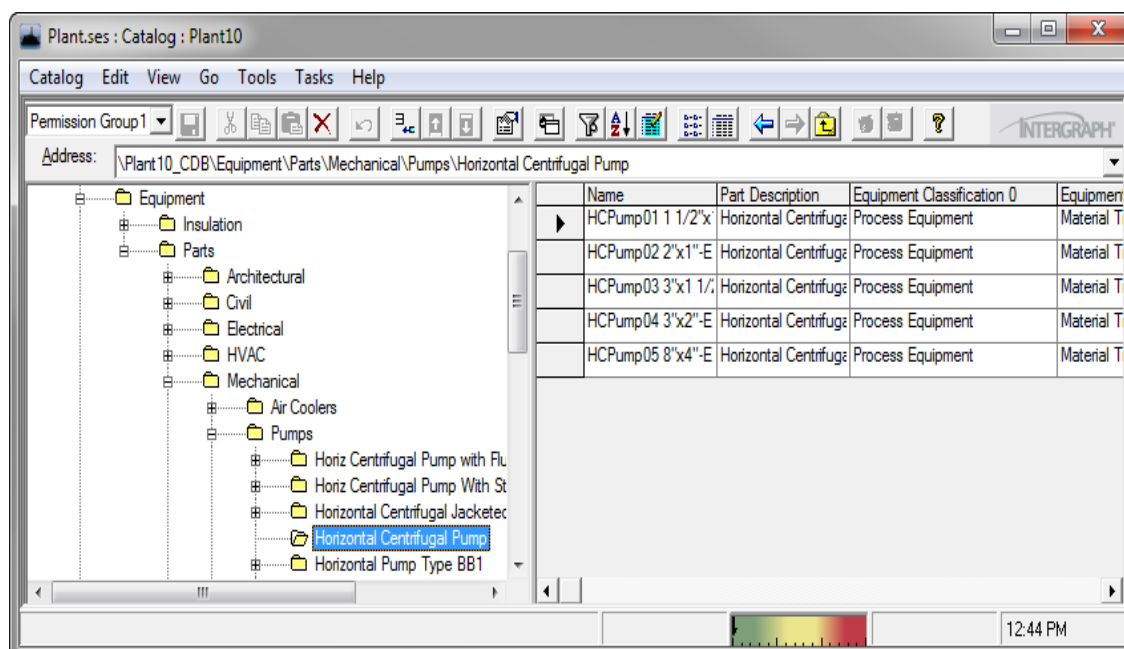
Navigating through the Catalog hierarchy is similar to navigating through Windows Explorer. You can use the mouse to open and close nodes in the Catalog hierarchy - clicking the ⊞ icon expands the node; clicking the ⊟ button collapses the node. You can also expand or close nodes by double-clicking on the node name. Additionally, you can use the navigational commands on the horizontal toolbar to move backward and forward through the items, or to move up to a higher order in the hierarchy.

What do you want to do?

- *Move Back to the Previous Level* (on page 68)

- *Return to the Previous Display* (on page 69)

- *Go to the Parent Classification* (on page 69)

Editable Grid

In previous versions of the software, specification writers and other project administrators used Microsoft Excel to modify all the delivered reference data and then used the Bulkload Utility for any additions, modifications, and deletions into the Catalog database. The **Catalog** task was read-only, except for the capability to modify permission group and status on the **Properties** dialog for certain reference data.

In this software release, you can use the **Catalog** task to create and manage piping, equipment, structure, and electrical reference data, as well as select lists, interfaces, and properties. You can toggle the content view between a read-only list view and an editable grid view.

TIP A third view option is available when you review branch table data, reinforcing weld data, and reinforcing pad data in human specification format. For more information, see *Using the Branch Table* (on page 38).

The editable grid view provides additional functionality for creating and editing reference data, such as embedded lists and configurable columns:
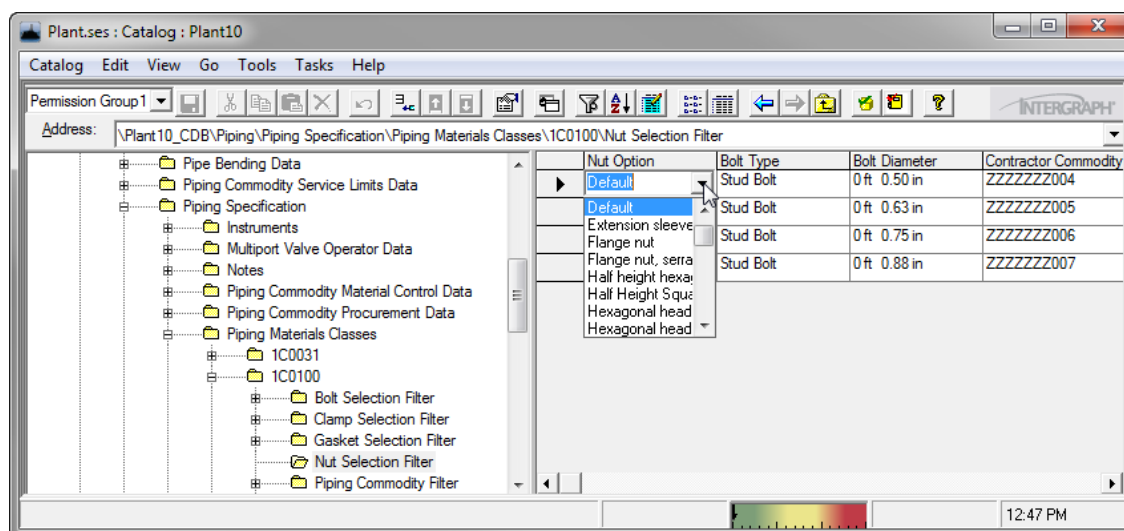
Using the **Catalog** task to create and manage reference data provides several significant advantages over the Excel and bulkload workflow:

- Create and modify data directly in the database.

- Multiple users can create and modify reference data simultaneously.

- Verification of some real-time data as you enter it into the editable grid, as well as provide an interactive interface for correcting inconsistencies in related data in other tables.

- Drop-down lists display appropriate select list values for properties.

- Set the Industry Practice property (ASCII, DIN, JIS, U.S. Practice, and so on) to filter all select lists in the Catalog database.

- Add values to existing select lists while entering specification data.

- Use the Branch Table to enter information in a format that is consistent with the human spec.

- Automatic creation of commodity codes as you enter part data, including a special user interface for building and selecting commodity codes based on property values of the part.

★ **IMPORTANT** Except for piping parts, piping specifications, piping rules, instruments, piping specialty data, conduit parts and specifications, cableway specifications, cabletray parts and specifications, there is no mechanism for exporting your reference data from the Catalog database back into a Microsoft Excel workbook. Consequently, if you intend to use the Bulkload Utility in tangent with the editing capabilities in the **Catalog** task, Intergraph PPM recommends that you implement a workflow that keeps the data in the Excel workbooks synchronized with the changes you make in the **Catalog** task. For more information about the Excel workbooks delivered with the software, see the *Reference Data Guide*, available from the **Help > Printable Guides** command in the software.

See Also

Using the Branch Table

Part of the workflow for creating a piping specification includes defining short codes in the branch table. The **Catalog** task provides a graphical user interface for viewing and modifying branch table data. The user interface looks like the human spec format, as shown in the following illustration.

To view branch table data, select the appropriate node in the Catalog tree view (Primary, Secondary, Tertiary):

NOTES

- Many specification writers only define a primary branch table for a given angle.

- The Catalog database that you create with the **Database Wizard** does not include the ranges defined for the Branch Table. To view the data in the special human spec format, you must use the **Tools > Add Range to Branch Table** command to create the ranges.

When you select the Branch Table node, the grid view displays all the defined short codes (Primary, Secondary, and Tertiary) in the same view. When you select the Primary, Secondary, or Tertiary node, the branch table view appears.

The abbreviations and angles that appear in this view correspond to the sizing data and short codes on the **PipeBranch** sheet in the Excel workbook.

Head	SpecName	HeaderSize	BranchSize	AngleLow	AngleHigh	HdrSizeNPDUnitType	BrSizeNPDUnitType	ShortCode	SecondaryShortCode	TertiaryShortCode
Start										
	AC0014									
		0.75	0.75	89.5deg	90.5deg	in	in	Tee		
		1	0.75	89.5deg	90.5deg	in	in	Reducing Tee		
		1	1	89.5deg	90.5deg	in	in	Tee		
		1.5	0.75	89.5deg	90.5deg	in	in	Reducing Tee		
		1.5	1	89.5deg	90.5deg	in	in	Reducing Tee		
		1.5	1.5	89.5deg	90.5deg	in	in	Tee		
		2	0.75	89.5deg	90.5deg	in	in	Reducing Tee		
		2	1	89.5deg	90.5deg	in	in	Reducing Tee		
		2	1.5	89.5deg	90.5deg	in	in	Reducing Tee		
		2	2	89.5deg	90.5deg	in	in	Tee		
		3	0.75	89.5deg	90.5deg	in	in	Thredolet		
		3	1	89.5deg	90.5deg	in	in	Thredolet		
		3	1.5	89.5deg	90.5deg	in	in	Thredolet		
		3	2	89.5deg	90.5deg	in	in	Thredolet		
		3	3	89.5deg	90.5deg	in	in	Tee		

See Also
Add Range to Branch Table Command (on page 143)
Add a Range to the Branch Table (on page 145)
Add Range Dialog Box (on page 981)

Viewing Item Properties

You can use the **Catalog** task to view the defined properties for all of the items that exist in the Catalog database. You can also display a graphical preview of a catalog item, if one has been defined for it in the reference data. The preview window can stay open as you click through the various nodes in the tree to find the correct part.

Depending on your level of access within the model, you can use the **Reference Data Properties** dialog box to modify the properties and status of an item, and the permission group to which it belongs.

What do you want to do?

Cache Behavior

When editing catalog data, you need to understand the two caches that the software uses in regard to catalog data. A cache is a short-term storage location on the client machine used to speed up software performance by temporarily placing a copy of previously retrieved reference data on the client where the software can access that information more quickly the next time it is needed.

The Catalog Cache

When the software on the client computer queries for catalog data for the first time, the software caches the results of the query (piping specification rules, part data, and so forth) on the client. This cache eliminates the need for the client software to constantly query and get data from the database itself, avoiding poor performance during subsequent placement and re-computes. Currently, to ensure that this cache is cleared after you have modified the reference data, the modeling designer (the client user of catalog data) must exit the software, and then re-start the session.

The Symbols Cache

The symbol system has a caching mechanism for all symbols that share the same set of input parameters and same set of outputs. By default the cache mechanism is active. A single object is created for each unique set of parameters for a symbol. Each symbol that is placed after the initial symbol, using these same parameters, is connected to the first symbol and uses that symbol's graphic object for display. Because the caching mechanism is automatic, it can sometimes cause problems when the symbol definition is changed.

A symbol definition (for example, a part) that has a non-parametric input will not be cached even if all the other inputs are parameters. However, if a custom method (CMcache) is written to convert the part into a parameter, then the symbol will be cached.

To make this change from a non-cached to cached for the case where non-cached symbols have already been placed in the model, the major version number of the symbol definition must be increased and the **Tools > Synchronize Model with Catalog** command in the **Project Management** task run. If this is not done, then the change in the way the part input is treated results in an error as the symbols already placed in the model are expecting a part, and not a parameter, and will fail to compute. For more information about 3D symbols, please refer to the *Smart 3D Reference Data Guide*. For more information about the **Synchronize Model with Catalog** command, see the **Project Management** documentation.

Controlling Catalog Access with Permission Groups

System administrators can associate branches of the tree view with permission groups to grant limited access for specific users and groups. When you create Catalog data in the editable grid, the **Active Permission Group** on the toolbar sets the permission group for the new data. Additionally, you can use the **Configuration** tab on the **Properties** dialog box to specify the active permission group.

You can restrict write access to select lists, piping specification data or other part data by assigning appropriate permissions on the parent folder. In order to modify permissions on a child folder, you must have write permission to the immediate parent folder. If a folder belongs to a permission group for which you have read-only access, you can view the data in that folder, but you cannot add new or modify existing data. For example, to restrict access to creating and modifying all piping reference data, an administrator must set the permission group on the top-level Piping folder to read-only.

You must have write permission on at least one permission group to create new objects. To modify an object, you must have write permission in the permission group of that object. The model database can have multiple permission groups, but Smart 3D supports only one permission group for the catalog database.

If a folder belongs to a permission group to which you have write or full control access, you can add data. In order to modify existing data, you must have write or full control access on that data. For example, if you have write or full control access to the Piping Materials Class folder but read-only access to the 1C0031 specification, you can copy 1C0031 and paste it to create a new specification, but you cannot modify the existing 1C0031 specification.

★ IMPORTANT You create permission groups for the Catalog database and assign levels of access to permission groups in the Project Management task. For more information, see the *Project Management User's Guide*, accessible from the **Help > Printable Guides** command.

Associating specific parts of the Catalog tree to permission groups not only controls which nodes are visible and editable to users within the Catalog task, it also controls the extent to which users are able to create or place those object types from the catalog in the model within other environments. For example, the administrator creates a Catalog permission group called Duct Permission Group in the Project Management task and assigns write access to its

members. In the Catalog task, the system administrator associates the Duct hierarchy folder with the Duct Permission Group.
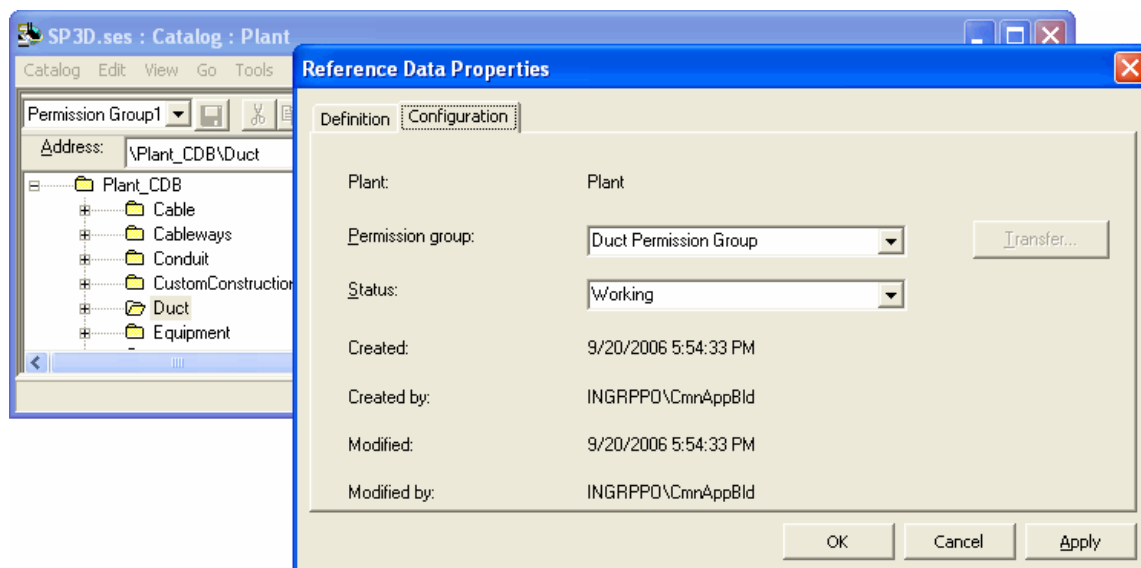
If a user who is not a member of the Duct permission group enters the HVAC task and attempts to create a duct, the software will not allow the operation.

What do you want to do?

- *Associate a Catalog Branch with a Permission Group* (on page)
- *Viewing Item Properties* (on page 40)

Associate a Catalog Branch with a Permission Group

1. Log in as an administrator on the client machine.

2. In the Catalog tree view, right-click on a branch and select **Properties**.

3. On the **Configuration** tab, use the **Permission group** list to select the permission group.

4. Click **Apply**.

5. Click **OK** to return to the Catalog window.

   TIP You can also use the **Active Permission Group** box on the toolbar to set the active permission group.

NOTES

- Only users who have read and higher types of access to the permission group associated with the selected branch are able to see the branch displayed in the Catalog tree view.

- Only users who have write or full control access to the permission group associated with the selected branch are able to add new or modify existing data in that branch.

- Only users who have write and higher types of access to the permission group associated with the selected branch are able to create and place those object types from the catalog in the model from within other tasks.

▪ You assign levels of access to permission groups in the Project Management task. For more information, see the *Project Management User's Guide*, accessible from the **Help > Printable Guides** command.

Managing Catalog Changes

There are no software restrictions to prevent you from modifying a live catalog; however, we do not recommend this as you may be editing something that another user is accessing simultaneously. Ideally, all catalog changes should be made at the beginning of a project before modeling begins. Because this is not always possible, we recommend that you create a "live" and a "test" catalog database. You should make all changes in the test catalog and verify the changes in a test model. After the changes are verified, an administrator should select a convenient time to have all users stop modeling, create a backup, and then use copy and paste to move the changes from the test catalog to the live catalog.

1. Establish databases for catalog and model:

    ▪ **New Customers** - Create catalog database from scratch or from templates, with or without bulkloading sample reference data.

    ▪ **Existing Customers** - Upgrade existing catalog and model databases

2. Copy databases with **Backup** and **Restore**. All reference data changes should first be made in the test catalog and then moved into the production catalog when appropriate.

3. Use **Tools > Options** in the Catalog task to define short codes, units of measurement, and piping specification unit of measurement in both databases. Currently, these settings cannot be copied from one database to another.

4. Create and modify any part classes, interfaces, and properties in the test catalog.

    ⭐ IMPORTANT

    ▪ In this release of the software, you cannot copy and paste part classes, interfaces, or properties from one catalog to another. You must use the **Backup** and **Restore** to move this data into the production catalog. Refer to "Full Catalog Restore from Backup" in the Project Management documentation.

    ▪ Using **Backup** and **Restore** will copy all changes from the test catalog into the production catalog.

    ▪ If the production catalog is an almost empty catalog, you must create at least one cableway outfitting cross-section in the production catalog prior to restoring the test catalog to the production catalog. For more information on creating cableway cross-sections see *Define Cableway Specifications* (on page 220) and *Define Cableway Shapes* (on page 220).

5. If you create part classes, run **Generate Views** to re-generate all of the database views in the test catalog.

6. Create and modify other reference data in the test catalog.

    ⭐ IMPORTANT

    ▪ In this release of the software, the Catalog task provides direct review and edit of all of the following types of reference data:

    Common

Select Lists

Interfaces and Categories

Cableway and Cable Tray

Conduit

Equipment

Equipment Components

Modules

Piping (both model and specification rules)

Standard Nozzles

Structure

- *Limitations:* The following reference data must be defined by bulkloading workbooks. This data is read-only in the **Catalog** task:

Cable

Catalog Filters (Editing done through **Filter Manager** in all tasks)

Hangers and Supports

HVAC

Interference Rules

Labels

Naming Rules

Piping Manufacturing

Reports

Shapes

Space

7. If you modified cable, HVAC, or other reference data through Microsoft Excel workbooks, use the **Bulkload Reference Data** utility to add those changes to the test catalog database. Use either:

- **Delete and replace mode** - To replace the contents of the database with the contents of the selected workbooks.

- **Append mode** - To add contents of the selected workbooks to the catalog.

8. Use **Tools > Check Data** and **Tools > Verify Consistency Report** to validate changes in the test catalog.

- **Check Data** - A command that interactively verifies the relationships between the data you enter into the editable grid against other data in the Catalog database.

- **Verify Consistency Report** - A report that compares piping specifications to Catalog data and verifies whether the piping commodities, piping specialties, and instruments in the Piping specification for a model are consistent with the data in the Catalog so that the required components can be created in the model.

9. In Project Management, run **Synchronize Model with Catalog** against the test model. This command globally updates the model database with all catalog changes, including properties and symbol changes, and optionally regenerates the database views.

10. Verify the catalog changes by placing objects in the test model database and reviewing any **To Do List** entries generated by the **Synchronize Model with Catalog** command. If necessary, repeat steps 4 through 9 to make corrections.

11. At an appropriate time, lock production users out of the production catalog and model.

12. Create backups of the catalog and model databases for both test and production.

13. Bulkload new and verified part classes from your test catalog into the production catalog.

    ★ IMPORTANT Do not substitute the production catalog with the test catalog. The test catalog is for testing purposes only. Backing up the test catalog is for the sole purpose of future testing.

14. If you created new part classes, use Windows Explorer to copy symbol files from the test SharedContent share to the production SharedContent share.

15. If you did not create new part classes, copy and paste reference data changes from the test catalog into the production catalog.

    ▪ **Select Lists** - You must copy select lists into the production catalog before copying other reference data that requires those select list values. However, if you only update textual values in existing select lists, you can copy those changes at any time.

    ▪ **Parts** - Part classes and their associated interfaces and properties must exist in the production catalog before you can copy the parts.

Data	Copy/Paste Granularity
Cable Tray Parts	All at once.
Cable Tray Specifications	Individual or all specifications at once. You must copy parts data separately. You must copy shapes data separately if you copy individual specifications.
Cableway Specifications	Individual or all specifications at once. You must copy parts data separately. You must copy shapes data separately if you copy individual specifications.
Cableway Shapes	All at once.
Conduit Commodity Material Control Data	Individual or all at once.
Conduit Parts	All at once.
Conduit Selection Rules	All at once.
Conduit Specifications	Individual or all specifications at once.

Equipment Insulation	All at once.
Equipment Parts	All at once.
Equipment Component Parts	All at once.
Piping Bolted Joint Parts	All at once.
Generic Dimensional Data	All at once.
Piping Insulation	All at once.
Piping Parts	All at once.
Pipe Bending Data	All at once.
Piping Commodity Service Limits Data	All at once.
Piping Specification > Instruments	All at once.
Piping Specification > Multiport Calve Operator Data	All at once.
Piping Specification > Notes	All at once.
Piping Specification > Piping Commodity Material Control Data	All at once.
Piping Specification > Piping Commodity Procurement Data	All at once.
Piping Materials Classes	Individual or all piping specifications at once. You must copy parts data separately.
Model Options	All at once.
Model Rules	All at once.
Valve Operator Material Control Data	All at once.
Tap Property Data	All at once.
Valve Operator Parts	All at once.
Select Lists	Individual or all select lists at once.
Structure Objects	All at once.
Structure Materials	All at once.

Structure Shapes	All at once.
Structure Plates	All at once.

16. If you modified cable, HVAC, or other reference data through Microsoft Excel workbooks, use the **Bulkload Reference Data** utility to add those changes to the production catalog. Use either:

   - **Delete and replace mode** - To replace the contents of the database with the contents of the selected workbooks.

   - **Append mode** - To add contents of the selected workbooks to the catalog.

17. Use **Tools > Check Data** and **Tools > Verify Consistency Report** again to make sure that all changes were copied from the test database to the production database.

   - **Check Data** - A command that interactively verifies the relationships between the data you enter into the editable grid against other data in the catalog database.

   - **Verify Consistency Report** - A report that compares piping specifications to the catalog data and verifies whether the piping commodities, piping specialties, and instruments in the piping specification for a model are consistent with the data in the catalog so that the required components can be created in the model.

18. In Project Management, run **Synchronize Model with Catalog** against the production model. This command globally updates the model database with all catalog changes, including properties and symbol changes, and optionally regenerates the database views.

19. Verify the catalog changes by placing objects in the production model database and reviewing any **To Do List** entries generated by the **Synchronize Model with Catalog** command.

20. Document reference data changes per your company or project guidelines.

21. Allow users back into production catalog and model.

12 Create Backup of Production & Test

If new part classes — **yes** → **13** Bulkload verified changes from Test into Production

no

15 Copy/Paste Other Reference Data Changes to Production

16 Run Bulkload (if needed)

17 Check Data & Verify Consistency

18 Synchronize Model with Catalog ← **14** Copy Symbols to Production Symbol Share

11 Lockout Users

19 Verify Changes in Production Model → **20** Document Reference Data Changes

21 Grant Access to Users

10 Verify Changes in Test Model

New Class

The **Catalog > New > Class** command defines a new class of reference data. Using this command, you can create pipe component classes, profile classes, and new feature classes. The command knows what type of class to create by what is active in the tree when you select the command.

If you are creating a new part class, you need to define a new part symbol or select one of the delivered part symbols to use before using this command. For more information about creating part symbols, see Creating Part Occurrence Symbols in Visual Basic in the *Smart 3D Symbols Reference Data Guide*.

After you have created new part classes using this command, you must run the **Catalog > Generate Views** command to regenerate all of the database views across the catalog. You do not have to run the **Generate Views** command after each part class that you create, but you must run the **Generate Views** command when you are finished creating part classes for that day. If you are working in a global workshare environment, the **Generate Views** command must also be run on each satellite catalog database.

🗐 NOTE In previous versions, you could only create new classes by editing the Microsoft Excel workbooks and then bulkloading the change. You can still use the bulkload method described in *Add Part Classes (Bulkload Method)* (on page 50) if you want.

See Also
New Class Dialog Box (on page 52)

Add Part Classes (Bulkload Method)

Before you begin this procedure, create a symbol definition for the part class that you will add. You can use .NET or Solid Edge to create the symbol definition. For more information about symbols, see the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

In the Excel workbook for your task, copy and rename an existing sheet with the name of the part class that you want to add. The example in this procedure uses **MyDistillationColumn** as the part class.

💡 TIPS

- It is helpful to draw a picture of the reference data hierarchy that you want before following this procedure.

- This picture shows the hierarchy in the procedure example.
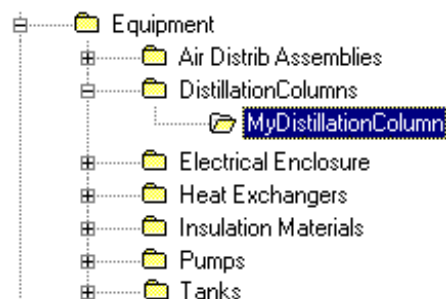
1. Open a reference data workbook in Microsoft Excel.

2. On the **ClassNodeType** sheet, insert a row before the **End** keyword and enter a name for the classification folder in the **ObjectName** column. For example, if you want to add a part class called **MyDistillationColumn** to the hierarchy, this part class can be grouped under a classification folder that contains distillation columns. In our example, enter **DistillationColObj** in the **ObjectName** column.

   TIP The object name of the classification folder is important because you will use it again in this procedure.

3. Also on the **ClassNodeType** sheet, enter the user interface name for the classification folder in the **Name** column. This name appears in the **Catalog** task user interface. In our example, type **DistillationColumns**.

4. On the **R-Hierarchy** sheet, relate the folder object names in the hierarchy. In our example, **CatalogRoot** is a parent to **RefDataEquipmentRoot**. The default hierarchy contains **CatalogRoot** in the **RelationSource** column and **RefDataEquipmentRoot** in the **RelationDestination** column.

5. Also on the **R-Hierarchy** sheet, in another row, type **RefDataEquipmentRoot** in the **RelationSource** column and **DistillationColObj** in the **RelationDestination** column.

   TIP All folders must be related in the hierarchy on the **R-Hierarchy** sheet, except the classification folder and the part class (these folders are related on the **R-ClassNodeDescribes** sheet).

6. On the **R-ClassNodeDescribes** sheet, relate the part class to the classification folder above the part class in the hierarchy. In the **RelationSource** column, type **DistillationColObj**. This name matches the object name of the classification folder that you entered on the **ClassNodeType** sheet. In the **RelationDestination** column, type the name of the part class, **MyDistillationColumn**.

7. Mark all of the rows that you added on the **ClassNodeType**, **R-Hierarchy**, and **R-ClassNodeDescribes** sheets with the letter **A**.

8. Bulkload the workbook in the **Add/Modify/Delete** mode.

NOTES

- For additional information about the hierarchy sheets referenced in this workflow, see the *Reference Data Guide*, available from the **Help > Printable Guides** command in the software.

- For information about bulkloading data into the Catalog database, see the *Reference Data Guide*, available from the **Help > Printable Guides** command in the software.

New Class Dialog Box

Used to define the properties of a new part class. The dialog box has tabs for defining the required information.

See Also

General Tab (New Class Dialog Box)

Defines the name, classification, symbol definition, and preview graphic for the new part class.

Name

Specify a unique name for the new class to identify the part class in the catalog schema. If you are using Microsoft SQL server, the part class name cannot exceed 31 characters. If you are using an Oracle database, the maximum number of characters is 23. Do not use special characters such as spaces < > . - ! ? + ' % , ; | & ~ * / \ $ in the names of part classes.

Display Name

Specify a name to use in the tree view for the part class.

Classification

Select the part classification. Part classifications define the minimum required interfaces for the new part class.

The part classifications that are available to select from are defined in the **Part Class Types**

select list. You can edit that select list to include additional part classifications, if needed. The software suggests a default classification based on the current node selection in the tree view. In some cases, such as under the Equipment node, the software will not be able to default this option.

Symbol Definition

Specify the symbol or SmartAssembly ProgID that represents the new part class.

If you are using a custom symbol, you need to get the symbol definition name from the person who created the symbol. The symbol definition that you need to enter here is indicated by the red arrows.

Preview Graphic

Specify the .bmp, .jpg, or .gif graphic to display when a user clicks **Preview** 🖻 on the ribbon.

If you are using a delivered symbol, the preview graphic name is usually the same as the symbol's ProgID name up to the period. For example, if the symbol ProgID is SP3DReturn.CReturn, then the preview graphic is SP3DReturn.gif.

If you are using a custom symbol, the graphic must be in the [ProdcutFolder]\SharedContent\SymbolIcons folder. We recommend that you use the same naming convention as the delivered symbols to limit confusion.

Codebase

Specify the symbol's cabinet file name (.CAB) located in the symbols share on the reference data server. An example of what to enter in the Codebase box is:

%CAB_SERVER%\CABs\SP3DReturn.CAB

★ **IMPORTANT** Enter the text %CAB_SERVER% literally; do not replace it with a server name. The software replaces the %CAB_SERVER% variable with your reference data server name and SharedContent share. For example, %CAB_SERVER%\CABS\SP3DReturn.CAB becomes [Product Folder]\SharedContent\CABs\SP3DReturn.CAB. In this example, you would have to create

---

the folder named CABs on your SharedContent.

When a user on a client computer places the symbol for this part class, one of the following happens:

- If the symbol is a new symbol to that client computer, the software automatically pulls to the client computer the dll in the CAB file on the server, and then automatically registers the dll on the client computer.

- If the symbol dll already exists on the client computer, the software compares the version number of the dll on the client computer with the version number of the CAB file on the server. If the dll in the CAB file is newer, the software automatically pulls to the client computer the newer dll in the CAB file, and then automatically registers the dll on the client computer.

For more information about creating symbol packages (.CAB files), see the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

Copy From

Click to use an existing part class as the basis for the new part class. All of the existing part class information, classification, symbol definition, and symbol occurrence information in copied into the dialog box.

Definition Tab (New Class Dialog Box)

Defines the interfaces, properties, and mapped parameters for the new part class.

Category

Select the Category that contains the interfaces to add to the part class. If the selected Category does not contain interfaces, nothing appears in the grid.

Interface Name

Select the interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab display grayed out. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the **General** tab. You need to map the symbol parameter name to the interface property that drives the parameter.

Delete

Removes the selected interface from the grid.

Occurrence Tab (New Class Dialog Box)

Defines the user defined interfaces, properties, and mapped parameters for the new part class.

Category

Select the Category that contains the user interfaces to add to the part class. If the selected Category does not contain interfaces, nothing appears in the grid.

Interface Name

Select the user interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab appear in gray. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the **General** tab. You need to map the symbol parameter name to the interface property that drives the parameter.

Delete

Removes the selected interface from the grid.

Connections Tab (New Class Dialog Box)

Defines the port connections types for the new part class.

Index

Displays the index number of the connection port.

Type

Select the type of connection port. You might need to refer to the symbol code to find out how many ports there are.

Delete

Removes the selected connection type from the grid.

New Item Command

Defines a new select list for use by the various task environments. A select list definition involves providing values for the required definition properties and an identifier that is unique across the entire Catalog database.

The **New Item** command is only available on the **Catalog** menu and is only enabled when the **Select List** node is selected in the tree.

New Select List Dialog Box (on page 970)

Add Select List Value Dialog Box (on page 971)

What do you want to do?

- *Select Lists* (on page 124)
- *Create a New Select List* (on page 125)

New Folder Command

The **Catalog > New > Folder** command, also available on the right-click pop-up menu, creates a new folder in the tree view. You can create new folders under the following root nodes in the tree view: **Cableways**, **Equipment**, **Equipment Components**, and **Structure**.

There are places in the tree view where you should not create new folders, for example under the Select **List** folder and in certain **Piping and Conduit** folders. Nor can you create new folders under a parts node. In those places, the software automatically disables this command.

 NOTE In previous versions, you could only create new folders by editing the Microsoft Excel workbooks and then bulkloading the change. You can still use the bulkload method to create new folders if you want.

Generate Views

The **Catalog > Generate Views** command regenerates all of the database views across the entire catalog. You must run this command after you have created new part classes using the *New Class* (on page 50) command. In addition, if this is a host catalog in a global workshare environment, you must have the satellite system administrators run this command on the satellite catalog databases.

 IMPORTANT Regenerating views can take several minutes to process and will affect the performance of other users in the catalog database.

Options Command

In the **Catalog** task, you can use **Tools > Options** to specify several options for entering and displaying catalog data. Additionally, you can require the software to check for data uniqueness as it is entered into the editable grid. The categories of options include:

- General Catalog Units Tab (Options Dialog Box)
- Piping Specifications Tab (Options Dialog Box)

- Short Codes Tab (Options Dialog Box)
- Piping Specification Units Tab (Options Dialog Box)
- Piping Catalog Units Tab (Options Dialog Box)

In general, these options are not user-specific. For example, the option to indicate whether the commodity code is dependent upon the schedule is not an option that would vary from one user to another. Instead, this option is characteristic of the piping specification, meaning two specification writers working on this data would want the option to be set the same way.

Options Dialog Box **(on page 972)**

What do you want to do?

- *Change a Displayed Unit of Measure* (on page 57)
- *Add a Short Code Value* (on page 57)
- *Delete a Short Code Value* (on page 59)

Change a Displayed Unit of Measure

1. Click **Tools > Options**.
2. On the **General Catalog Units** tab, in the **Unit** column, find the type of measurement whose unit of measure display you want to change.
3. Click in the **Readout** column of the appropriate row.
4. Select the unit of measure that you want from the list.

🗏 NOTES

- You can also change the number of digits after a decimal displayed for types of measure. Click in the **Precision** field, and type the number of digits that you want to appear after the decimal point.
- The **Precision** field is disabled when the **Readout** is set to fractional.
- You can define units of measure on the **General Catalog Units**, **Piping Specification Units**, and **Piping Catalog Units** tabs. The units can be different between each of these.

Add a Short Code Value

1. Click **Grid View** 🏢 on the toolbar.
2. Click **Tools > Options**.
3. Select the **Short Code** tab.

4. Scroll down to the bottom of the list, and click the empty cell in the **Short Code** column.
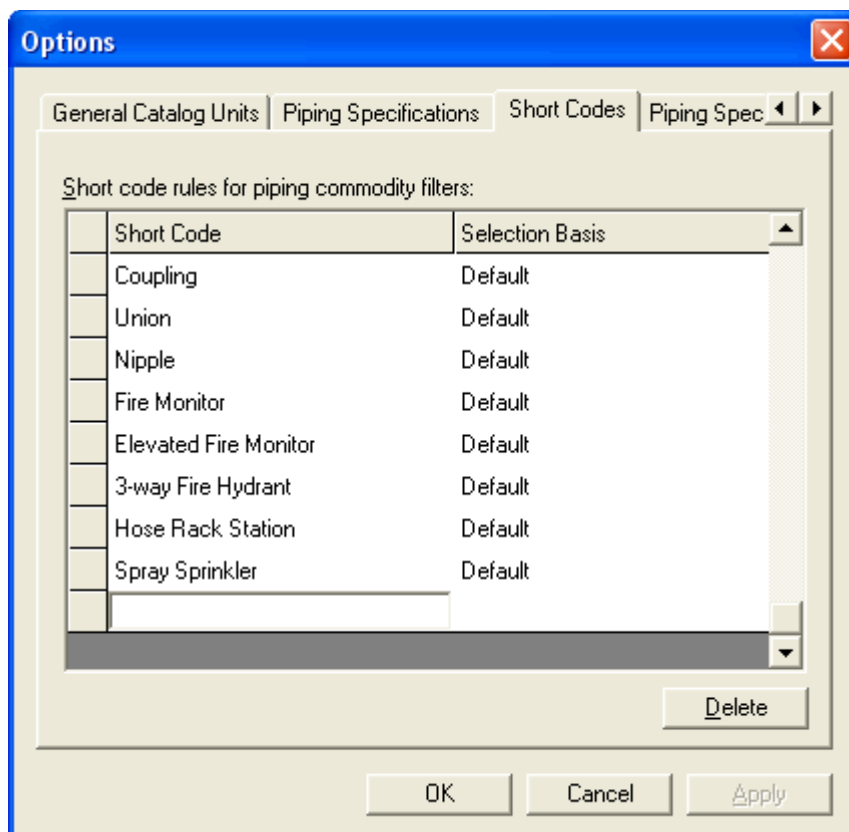
5. Type a name for the new short code. Short code names must be unique across the Catalog database.

6. Click in the corresponding **Selection Basis** column, and select a selection basis, if necessary.
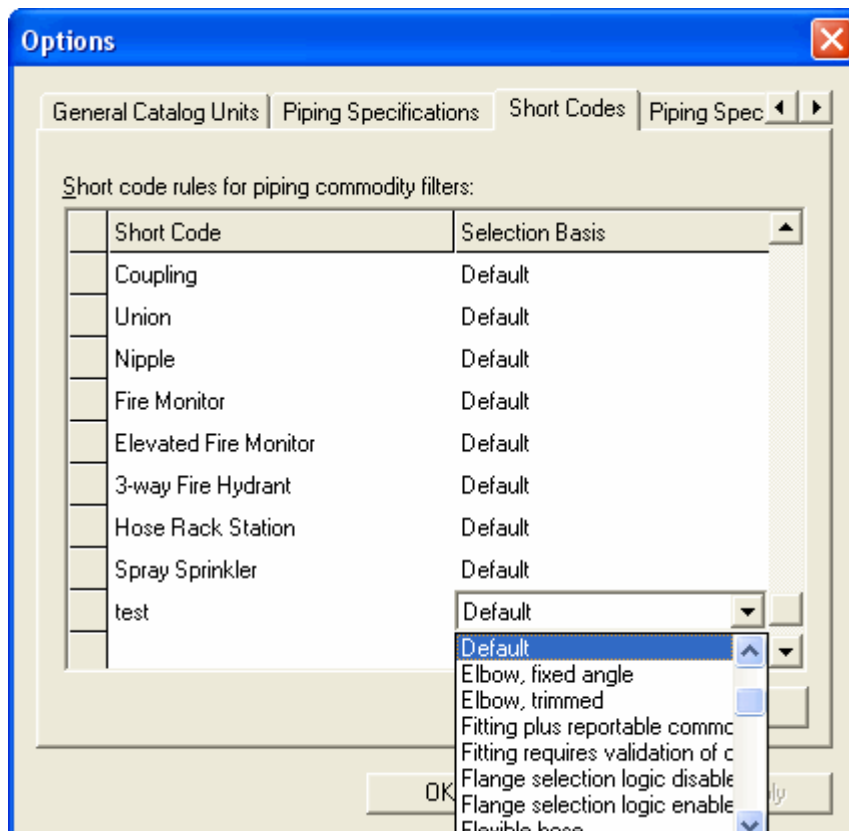
7. Click **OK** to save the short code to the Catalog database and close the dialog box.

📝 NOTE You can click **Apply** to save the new short code to the Catalog database and keep the dialog box open so that you can continue to define additional short code values.

Delete a Short Code Value

1. Click **Tools > Options**.

2. On the **Short Code** tab, select the row that you want to delete.

3. Click the **Delete** button on the dialog box tab.

4. Click **OK** to delete the selected short code.

   📝 NOTE You can click **Apply** to delete the selected short code keep the dialog box open so that you can continue to work with the short code values.

Save Command

Saves the active row to the Catalog database. The command is only available after you insert a new row or modify an existing row in the editable grid.

What do you want to do?

- *Select Lists* (on page 124)
- *Define the Display Order of a Select List* (on page 127)

Insert Row Command

Inserts a blank row into the editable grid so that you can create a new entry in a grid view. This command is only available for reference data that is editable.

The **Insert Row** command is also available on the **Edit** menu. In addition, you can press the **INSERT** key on the keyboard to insert a new row.

Add a New Row

1. Select **Grid View**.
2. Select a row in the editable grid.
3. Click **Insert Row**. The software inserts a blank row at the bottom of the editable grid.

   NOTE If you have applied a sort to the grid, when you save the new row the software will automatically re-apply the sort criteria to the grid and move the new row to the correct location.

Move Up Command

Moves the select list entry up one row in the editable grid. The command is only available when you select a select list entry in the editable grid.

What do you want to do?

- *Select Lists* (on page 124)
- *Define the Display Order of a Select List* (on page 127)

Move Down Command

Moves the select list entry down one row in the editable grid. The command is only available when you select a select list entry in the editable grid.

What do you want to do?

- *Select Lists* (on page 124)

- *Define the Display Order of a Select List* (on page 127)

Properties Command

Displays the **Reference Data Properties** dialog box from which you can view standard and custom properties for the selected classification, part class, or object in the Catalog database hierarchy. This information is pulled directly from the reference data. You can leave the dialog box open as you select different object in the **Catalog** task.

View Item Properties

1. Select a folder in the tree.

   TIP You can also expand a part class folder in the Catalog tree view, and then select an object in the content view.

2. Click **Properties** on the horizontal toolbar to display the *Reference Data Properties Dialog Box* (on page 962).

NOTE To change the value in the **Permission Group** list on the **Configuration** tab, you must have write access to both the present permission group and the new permission group.

Preview Command

⊟ Opens a graphic preview file that was assigned to a part or part class in the reference data. You can leave this **Preview** window open as you select different part and part classes.
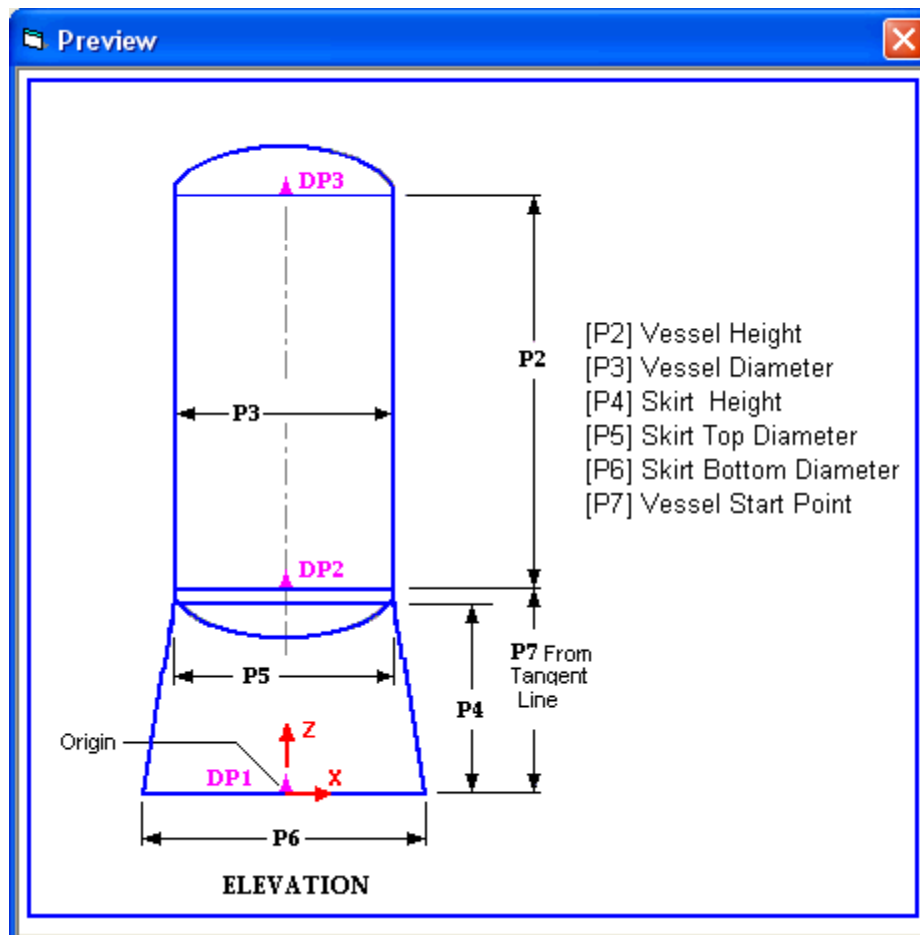
A preview graphic is helpful for illustrating what the 3D model symbol for that part or part class looks like. For more information on defining a graphical preview for a specific part, see "Add a Preview Graphic to Parts" in the *Smart 3D Symbols Reference Guide* accessible from the **Help > Printable Guides** command in the software.

Preview Dialog Box **(on page)**

View a Preview Picture

1. In the Catalog tree view, select the item for which you want to see the preview picture.

2. Click **Preview** 🖼 on the horizontal toolbar.

3. The software displays an image of the selected item.

📑 **NOTES**

- The software displays "No Picture Available" if a preview graphic has not been defined for the selected part class. A preview graphic for the selected part or part class must be defined in the reference data before you can view it in the **Catalog** task. For more information about defining preview graphics, see the topic "Add a Preview Graphic to Parts" in the *Smart 3D Reference Data Guide*.

- Some items, such as those restored from the template files delivered with the software, may not have preview information in the OEM Catalog. For more information, see the *Smart 3D Reference Data Guide* accessible from the **Help > Printable Guides** command in the software.

Filter Command

🖤 Filters data in the grid view by the existing data in the grid. This command only hides data from displaying in the grid view; it does not delete data from the catalog. When you select this command, the filtering row appears at the top of the grid. You can select the columns of data that you want to filter by filtering the data by multiple columns. To clear the filtering on a column, in the filtering row for that column, select **(All)**.

To filter a column by partial string matching, select **(Custom)** to activate the **Custom Filter** dialog box. Using this dialog box you can search for partial strings using "begins with", "does not begin with", "contains", and so forth using the asterisk (*) wildcard for multiple characters and a question mark (?) for a single character. Use the **And** and **Or** options to concatenate two search criteria.

Spec Name	Fluid Service	Materials of Construction Class	Materials Description
1C0031	(All)	Undefined	CL150 RFFE, CS, Trim 8,
1C0100	(Custom...) ASME Class 150	CACRC1	CL150 RFFE, CS, PTFE L
1C0101	Lube and seal oi	CACRC1A	CL150 RFFE, CS, PTFE L
1S3977	Catalyst lift lines Low pressure CL	Undefined	CL150 RFFE, 304/CS Va
1S3984	Cooling water	Undefined	CL150 RFFE, 304/316 Va
2C0032	Piping Spec N0! Process	Undefined	CL300 RFFE, CS, Trim 8,
2L1670	Catalyst lift lines	Undefined	CL300 RFFE, 1.25Cr-0.5N

You must have the **Grid View** ▦ active to filter. You cannot filter the **List View** 🗏. This command is available on the ribbon and on the **View** menu. You cannot use this command to filter Select Lists or branch table data.

Filter Data in a Grid View

1. Select **Grid View** ▦.

2. Select **Filter** ▽.

3. In the column you want to filter by, select what to filter by in the first row.

◈ NOTES

- You can filter by multiple columns.

- Clear filtering in a column by selecting **(All)** in the filter list.

- Use the **(Custom)** option to filter by partial string matching and wildcards.

Sort Command

↕ Activates the **Sort** dialog box, which you can use to sort data on multiple columns. The software saves the sort information in the catalog database, not your session file. Therefore, any view customizations that you make are seen by all users of that catalog. Select Lists and branch table views cannot be sorted.

Sort Dialog Box

Defines how to sort the displayed data.

Available columns

Lists all the property columns in the current view that you can sort on. To sort on a column in this list, select the column and then click **Add**.

Selected columns

Lists all property columns in the current view that you want to sort on. The order that the property columns appear in this list (top to bottom) is the order that the data will be sorted by, with the top column property being sorted first. To remove a column from the sort, select the column and then click **Remove**.

Add

Moves the selected property columns to the **Selected columns** list.

Remove

Moves the selected property columns to the **Available columns** list.

Move Up

Moves the selected property columns up in the **Selected columns** list. The higher in the list, the earlier that column is sorted.

Move Down

Moves the selected property columns down in the **Selected columns** list. The lower in the list, the later that column is sorted.

Sequence

Select how to sort the column property data. Select **Ascending** to put the lowest number, the beginning of the alphabet, or the earliest date first in the sort list. Select **Descending** to

put the highest number, the end of the alphabet, or the latest date first in the sort list. Blanks are always sorted last.

Sort Data

1. Click **Sort** 🔼 on the ribbon.

2. In the **Available columns** list, select the property columns to sort by.

3. Click **Add**.

4. In the **Selected columns** list, set a sequence for each column.

5. Click **OK**.

Customize Current View Command

📝 Activates the **Customize Current View** dialog box, which you can use to show and hide property columns and control the property column display order (the order from left to right). You can define custom views for everything except Select Lists and branch table data.

The software saves the customized view information in the catalog database, not your session file. Therefore, any view customizations that you make are seen by all users of that catalog.

Customize Current View Dialog Box **(on page 978)**

What do you want to do?

- *Hide Property Columns* (on page 65)
- *Rearrange Property Columns* (on page 66)
- *Show Property Columns* (on page 66)

Hide Property Columns

1. Click **Customize Current View** 📝 on the ribbon.

2. In the **Selected columns** list, select the property columns to hide.

3. Click **Remove**.

4. Click **OK**.

📝 NOTE You cannot hide required property columns. The required property columns names display in gray.

Rearrange Property Columns

1. Click **Customize Current View** on the ribbon.
2. In the **Selected columns** list, select the property columns to move.
3. Use **Move Up** and **Move Down** to place the column where you want it.
4. Click **OK**.

Show Property Columns

1. Click **Customize Current View** on the ribbon.
2. In the **Available columns** list, select the property columns to show.
3. Click **Add**.
4. Use **Move Up** and **Move Down** to place the column where you want it.
5. Click **OK**.

List View Command

Displays the information in the content view in a list format, as illustrated in the following graphic. The list view is always read-only.

This view is useful for administrators who have full control access to all catalog data and want to avoid inadvertently changing data in the grid view.

Short Code	First Size From	First Size To	First Size Units
45 Degree Direction C...	0.75	1.5	in
45 Degree Direction C...	2	36	in
45-90 Degree Direction...	2	36	in
90 Degree Direction C...	0.75	1.5	in
90 Degree Direction C...	2	36	in
90 Degree SR Elbow	2	18	in
<45 Degree Direction ...	2	36	in
Ball Valve	0.75	1.5	in
Ball Valve	2	4	in
Blind Flange	0.75	24	in
Blind Flange	26	36	in
Butterfly Valve	6	8	in
Butterfly Valve	10	24	in

What do you want to do?

- *View Catalog Items in a List* (on page)
- *View Item Properties* (on page)

View Catalog Items in a List

1. In the Catalog tree view, select an item.

2. Click **List View** on the horizontal toolbar.

NOTES

- Information appears in the content view (right window pane) only when you have selected a class folder in the tree view. A class folder contains parts, rather than additional folders.

- After you have activated the list view, all information in the content view appears as a list until you activate the grid view.

- The list view is read-only. To edit reference data, switch to the grid view. See *Grid View Command* (on page 67).

Grid View Command

 Displays the information in the content view in a table format, as illustrated in the following graphic:

	Short Code	First Size From	First Size To	First Size Units	Sec
	45 Degree Direction (	0.75	1.5	in	<un
	45 Degree Direction (	2	36	in	<un
	45-90 Degree Directi	2	36	in	<un
▶	90 Degree Direction (	0.75	1.5	in	<un
	90 Degree Direction (	2	36	in	<un
	90 Degree SR Elbow	2	18	in	<un
	<45 Degree Direction	2	36	in	<un
	Ball Valve	0.75	1.5	in	<un
	Ball Valve	2	4	in	<un

Using the grid view, you can create and edit piping, equipment, structure, and electrical specification and part data, as well as select lists, interfaces, and properties. For more information about creating and editing reference data through the user interface, see *Editable Grid* (on page 37).

What do you want to do?

- *View Catalog Items in a Grid* (on page 68)
- *View Item Properties* (on page 61)

View Catalog Items in a Grid

1. In the Catalog tree view, select an item.

2. Click **Grid View** ▦ on the horizontal toolbar.

NOTES

- When the grid view is active, you can create and edit reference data. For more information, see *Editable Grid* (on page 37).

- After you have activated the grid view, all information in the content view appears in a grid until you activate the list view.

- The grid view allows you to highlight items by row, which may make it easier to examine Catalog items with long sets of properties.

Back Command

◀ Highlights and displays the last level in the hierarchy that you viewed. You can click **Back** repeatedly to retrace your path through several levels. This command is not available when you first open the task, if you have not yet selected an item or folder during this work session, or if you are displaying the first item in the history list.

Move Back to the Previous Level

Click **Back** ◀ on the horizontal toolbar.

NOTES

- This command displays the last level in the hierarchy that you viewed. You can click **Back** repeatedly to retrace your path through several levels.

Forward Command

▶ Advances the display forward to return the browser display to the last item that you selected before you used the **Back** command.

NOTES

- You can click **Forward** repeatedly to retrace your path through several levels.

- This command is not available if you are displaying the top classification in the hierarchy, the last level in the history list, or if the **Back** command has not been used.

Return to the Previous Display

Click **Forward** ➡ on the horizontal toolbar.

NOTES

- You can click **Forward** repeatedly to retrace your path through several levels in the hierarchy.

- This command is not available if you are displaying the top classification in the hierarchy, the last level in the history list, or if the **Back** command has not been used.

Up One Level Command

Moves the focus up one level in the Catalog hierarchy. This command is not available when you select the root level of the tree.

Go to the Parent Classification

Click **Up One Level** on the horizontal toolbar.

NOTES

- This command displays the parent classification in the hierarchy.

- This command is not available if you are displaying the top classification in the hierarchy.

Custom Commands

Provides end-user application programming capability for the 3D software. Using Microsoft® Visual Basic, you can create a custom command that groups a series of commands and instructions into a single command that runs as an operation in the 3D software. As a result, you can access the customized commands that directly relate to the work routine in your operation.

Use the **Visual Basic Command Wizard** to help you build a custom command. For example, the wizard's first step prompts you to identify general information including command name, project name, author, and company. Start the wizard in Visual Basic by clicking **Command Wizard** on the **Add-Ins** menu. For more information about installing the Command Wizard and other programming resources, see the *Intergraph Smart*™ *3D Installation Guide*, available by clicking **Help > Printable Guides** in the software.

After adding a custom command in the 3D software, you can edit it using the **Edit Custom Command** dialog box which requires you to specify the program identifier (prog_id), command name and description, command priority, and a command line of arguments in a string.

Delivered Custom Commands

The following list provides descriptions and ProgIDs for the delivered custom commands. For more information consult the *Database Integrity* (DBI) *Guide* and the *Common User's Guide* (**Tools Menu > Custom Commands**). Both are available from **Help > Printable Guides**.

Custom Command	Check Database Integrity
ProgID	SP3DCheckDatabaseIntegrity.CCheckObj
Description	Creates records for the objects that need to be cleaned. Run this custom command directly on a database (site, catalog, or model). Then, you can generate a report to review the errors that the Check Database Integrity command generated. For more information on this command, see the *Database Integrity Guide*.

Custom Command	Clean Database
ProgID	SP3DCleanDatabaseCmd.CCheckObj
Description	Deletes or cleans an object. Use this command when an action on the Check Database Integrity report is To Be Removed or To Be Repaired. For more information on deleting and cleaning objects in the database, see the *Database Integrity Guide*.

Custom Command	Create Drawing View
ProgID	MenuDrawView.CMenuDrawView
Description	Saves and converts the contents of a three-dimensional graphic view window into a snapshot view. This command creates a rectangular object associated to a clipping volume, or volumes, in the three-dimensional model.

Before you create a snapshot view using this command, you must have added at least one composed drawing type to the Management Console in the Drawings and Reports task.

You can save additional views by updating the view contents and then saving the new design. If you used the **Tools** > **Hide** command to avoid displaying certain objects, those objects are included in a composed drawing you create.

To use the **Tools** > **Snapshot View** command, you must have appropriate permissions to access composed drawing types. If you have only read permission, you receive a message that alerts you to this condition.

After you create the snapshot views, you can add them to composed drawings when you use the **Tools** > **Drawings Console** command. |

Custom Command	Duplicate Part Numbers
ProgID	DuplicatePartNumbers,Ingr.SP3D.ProjectMgmt.Client.Commands.DuplicatePartNumbersCommand
Description	Repairs duplicate parts that exist in the catalog, including any proxies that might also exist in all the associated models. The command is available only when you have selected a catalog in the Project Management tree.

★ IMPORTANT In a Global Workshare environment, you must run this command only from the host location. |

Custom Command	Find Object by OID
ProgID	SP3DFindObjectByReport.FindObjects
Description	Finds objects with integrity problems in a graphic view. Before running this command, you must define your workspace to include these objects. Run a database integrity report, and use the reported OIDs of the objects in the workspace definition. For more information on this command, see the *Database Integrity Guide*.

Custom Command	Fix Project Root
ProgID	SP3DPRJMGTRepairCmd.FixCnfgProjectRoot
Description	Synchronizes the model name in the model database and the site database. The name in the site database prevails. You must run this command from a task in the model, not from Project Management.

Custom Command	Large Sector Utility
ProgID	DwgBinaryEditorCmd.FixSectorSize
Description	Converts existing production drawings from a small to a larger sector format to avoid exceeding Microsoft structured storage limits and causing errors to occur.

Custom Command	Model Data Reuse (MDR) Validation Tool
ProgID	MDRValidation.CValidateGeometry
Description	Helps you in analyzing the MDR results. If MDR is performed across models, you must run this tool on both the source and the destination models to enable analysis of the results. The tool locates the objects in the model that failed to copy as well as the objects that have a data mismatch with the source and the destination. Information for this tool is provided in the *Project Management User's Guide*.

Custom Command	Modify Style
ProgID	ModifyStyleCmd.ModifyStyles
Description	Modifies system-based styles existing in a custom model database. For information on creating correct style colors, see Format Style.
	For older databases (created before version 06.00.22xx), run this custom command to update the database; then exit the application. Delete the old session file and open with a new session file. The new colors are available.
	New databases (created after version 06.00.22xx) automatically use the corrected colors.

Custom Command	Place Piles
ProgID	PileFoundation,PileFoundation.PileFoundation
Description	Provides a placement wizard to facilitate the modeling of pile members. Through the **Place Piles** command, you can specify the number of piles in each direction as well as edge clearances and depth dimensions. You can also specify the member cross section and material for the piles.

Custom Command	Placing Supports from XLS
ProgID	PlacingSupportsFromXLS,PlacingSupportsFromXLS.PlacingSupportsFromXLS
Description	Places support information from an .xls file into Smart 3D. You must run this command from Smart 3D, and not from Project Management. For more information, see *Placing Supports from XLS Command* in the *Smart 3D Hangers and Supports User's Guide*.

Custom Command	Remove Design Basis
ProgID	IMSEngFrameworkCmd.RemoveDsgnBasis
Description	Removes all correlation relationships and then deletes all design basis objects in the 3D model.
	This command is useful when you want to register to a different SmartPlant foundation database.
	After running this command, you must register the model, retrieve information, and correlate the objects again.
	You must run this command from a task in the model, and not from Project Management.

Custom Command	Repair Documents
ProgID	DwgRepairCmd.RepairDocuments
Description	Updates invalid Styles.sha or Symbol Browser file paths on a document or a set of documents. Invalid file paths can occur when you change the symbol share. This causes overhead while editing, saving, or updating documents.

Custom Command	Repair Duplicate Permission Group ID
ProgID	RepairDuplicatePermissionGrpID,Ingr.SP3D.ProjectMgmt.Client.Commands. RepairDuplicatePermissionGrpIDCommand
Description	Lists all catalogs and models that have a duplicate permission group ID.
	Select the catalogs and models to repair. You cannot select all of the databases under a particular duplicate permission group ID.
	This command can only be invoked from Project Management.
	This command cannot be run from a satellite location. You should run this command only from the host location.

Custom Command	Repair Permission Groups
ProgID	PermissionGroupsAndLocations,Ingr.SP3D.ProjectMgmt.Client.Commands.PermissionGroupsAndLocationsCommand
Description	Repairs the corrupted relationship between permission groups and the location for both catalog and model permission groups. If a permission group has lost the relationship with a location or has multiple relationships, then this command re-establishes a proper relation. This command cannot be run from a satellite location. You should run this command only from the host location. 📝 NOTE Users with full permissions in the corrupted permission group can only re-establish the relationship.

Custom Command	Repair Style Path
ProgID	DwgRepairCmd.RepairDocuments
Description	Fixes Symbol and Style paths on RAD documents.

Custom Command	Synchronize Drawing Component Templates
ProgID	DwgSynchTemplatesCmd.SynchTemplates
Description	Repairs a drawing component that has become corrupted by synchronizing it with a different, uncorrupted drawing component. This command requires that the source component is the same type as the corrupted component, and that the source component cannot be corrupted. Also, the number of views on the source component must be the same as the number of views on the corrupted component. The names of the views on the source component must match the view names of the corrupted component.

Custom Command	Synchronize Drawing Templates
ProgID	DwgSynchTemplatesCmd.SynchTemplates
Description	Synchronizes, or copies, a template from one drawing component to another.

Custom Command	Verify P&ID Integrity
ProgID	SP3DDisplayPIDService.VerifyPIDCmd
Description	Validates the internal connections between objects on a P&ID and objects in the model database. This command is useful when there is a problem displaying a P&ID or selecting objects on a P&ID. The command provides some basic troubleshooting statistics: number of design basis objects, number of 3D objects (correlated), number of P&ID objects, number of deleted P&ID OIDs, and number of duplicate OIDs.
Custom Command	Profile Auto Bound
ProgID	mhprofileautobound.AutoBoundProfile
Description	Creates mutual bounding between stiffeners profiles or profile edge reinforcements present on the chute plates. The command requires that the chute plates be mutually bounded to each other and that the distance between the stiffener\edge reinforcement is between 0 to 0.01m.

Custom Command	Audit Tool
ProgID	stAnalysisTool.AuditTool
Description	Compares two databases using an SQL query. The databases can be on different servers and have different catalog schema. Changed objects can be displayed in the workspace of the current model. This command is useful after performing a migration, synchronization, or hull swap.

Custom Command	GC Menu
ProgID	GCMenu.Activate
Description	Places the **GC** menu on the software toolbar. This menu contains commands for creating geometric constructions, GC sets, and GC macros. For more information, see *Geometric Construction Macros (GC Menu)* in the *Molded Forms User's Guide*.

Custom Command	Verify Seam Pattern to Split
ProgID	SplitCommands.VerifySeamPatternToSplit
Description	Checks the status of seams and plates split by the seams. This command provides a count of successful and failed splits, and modified, new, identical, and deleted leaf systems. You can also display the objects affected by the seams by selecting one or more of the following options: **Identical Bodies (Green)**, **Modified Bodies (Yellow)**, **New Bodies (Red)**, **Deleted Bodies (White)**, or **Bad Splitters (Blue)**. This command is useful when swapping an old imported hull system with a new hull. For more information, see *Swap Hulls on a Detailed Model Using Molded Forms Delay* in the *Molded Forms User's Guide*.

What do you want to do?

- *Create custom commands* (on page)
- *Add custom commands* (on page)
- *Run a custom command* (on page)
- *Edit a custom command* (on page)
- *Delete a custom command* (on page)

Create custom commands

1. Open Microsoft® Visual Basic.
2. In Visual Basic, click **Add-Ins** > **Command Wizard**.
3. Complete all steps on each page of the **Command Wizard**.

   ### ♥ TIPS

   - You do not create custom commands within the software. You create them in Visual Basic using the **Command Wizard**.
   - You must install the **Command Wizard** software in Visual Basic. The setup for the **Command Wizard** (SP3DCommandWizardV2.exe) is located in the *[Product Folder]*\Programming\Tools\CommandWizard folder.

Add custom commands

1. Click **Tools** > **Custom Commands**.
2. On the **Custom Commands** dialog box, click **Add**.
3. On the **Add Custom Command** dialog box, type the program identifier you assigned to the command in Microsoft® Visual Basic in the **Command ProgID** box.
4. Type the name you assigned to the command in the **Command name** box.

5. Type a phrase that describes the command in the **Description** box.

6. If necessary, change the option in the **Priority** section.

7. Type command line arguments in a string in the **Argument** box.

   TIP After you complete this procedure, the **Custom Commands** dialog box lists the command you added to the software. You can run the command, edit the settings, or delete the command.

Run a custom command

1. Click **Tools** > **Custom Commands**.

   *The **Custom Commands** dialog box opens.*

2. To start a custom command you created, select the command in the list box, and click **Run**.

3. After the command runs, click **Close** on the **Custom Commands** dialog box.

Edit a custom command

1. Click **Tools** > **Custom Commands**.

   *The **Custom Commands** dialog box opens.*

2. To change the options for a custom command, select the command in the list box, and click **Edit**. For example, you can change the name and description of the command.

3. After completing the needed changes, click **Close** on the **Custom Commands** dialog box.

NOTE You must open the command in Microsoft® Visual Basic if you want to edit the underlying code.

Delete a custom command

1. Click **Tools** > **Custom Commands**.

   *The **Custom Commands** dialog box opens.*

2. Select the command in the list box, and click **Delete**. The software removes the command from the list box; however, the command code is not deleted.

3. After completing the needed changes, click **Close** on the **Custom Commands** dialog box.

NOTE This action does not delete the DLL for the custom command. It just removes access to the custom command from the user interface.

See Also

Custom Commands Dialog Box

Adds and edits customized commands you have created with the **Command Wizard** in Microsoft® Visual Basic. For information on creating custom commands, see *Create custom commands* (on page 77).

Command names

Lists the names of commands that have been added.

Run

Starts the custom command you select in the list box. For more information, see *Run a custom command* (on page 78).

Close

Cancels the **Custom Commands** dialog box.

Edit

Opens the **Edit Custom Command** dialog box. You can change settings for the command, such as the program identifier (prog_ID) and command name. For more information, see *Edit a custom command* (on page 78).

Add

Installs the custom command into the software. For more information, see *Add custom commands* (on page 77).

Delete

Removes the custom command from the software. For more information, see *Delete a custom command* (on page 78).

Clear

Deletes the information you have typed in the boxes on the **Custom Commands** dialog box.

Description

Contains an identifying phrase so you can better recognize the custom command with which you are working

Add Custom Command Dialog Box

Accesses a customized command you created in Microsoft® Visual Basic and saves the command within the software.

Command ProgID

Identifies the program identifier for the custom command you created in Visual Basic.

Command name

Specifies the name you assigned to the custom command.

Description

Describes the custom command.

Priority

Assigns a priority of **High**, **Normal**, or **Low**.

Argument

Specifies command line arguments in a string.

Edit Custom Command Dialog Box

Changes options for a customized command you added to the software.

Command ProgID

Specifies the program identifier for the custom command you created in Microsoft® Visual Basic.

Command name

Provides a text box for you to change the name you assigned to the custom command.

Description

Provides a text box to provide a descriptive phrase for the custom command.

Priority

Changes priority to **High**, **Normal**, or **Low**.

Argument

Change the command line arguments in a string.

Reset Default

Returns the dialog box to its default settings.

Copying and Pasting

If you are using the recommended workflow of having a 'test' catalog and a 'production' catalog, you will need to copy and paste between the two catalogs. In addition, there may be times you want to copy and paste within the same catalog. Because much of the catalog data is inter-related or dependent on other catalog data, the copy and paste command are limited or not available in certain situations.

In general, if the data is editable in the **Catalog** task, then you can perform these copy and paste actions:

- Copy and paste individual cells in the grid view from one row to another row.

- Copy and paste multiple cells in the grid view from one row to another row.

- Copy and paste an entire row in the grid view to create a new row in the same grid.

More elaborate copy and paste operations are available depending on the selected items and their location in the catalog. For more information, see *Copying and Pasting within the same Catalog* (on page 82) and *Copying and Pasting between Test and Production Catalogs* (on page 83).

At this time, you cannot copy and paste:

- Interference Rules

- Naming Rules

- Labels

- Cable data

- Piping Manufacturing data

- Reports

- Shapes

- Space Management data

★ **IMPORTANT** While a catalog copy and paste operation is in progress, do not copy and paste data or files in another application or in the operating system. Doing so may cause the catalog data to be erased from the clipboard resulting in paste problems.

For more information, see *Copying Filters Between Catalogs* (on page 96).

Copying and Pasting within the same Catalog

You can copy and paste many types of catalog data within the same catalog.

General Considerations

When copying and pasting within the same catalog, you can:

- Copy and paste individual cells in the grid view from one row to another row.
- Copy and paste an entire row in the grid view to create a new row in the same grid.

Cableway and Cable Trays

When copying and pasting cableway and cable tray data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Conduit

When copying and pasting conduit data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Equipment

When copying and pasting equipment data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Piping

When copying and pasting piping data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item defined by a new commodity code.
- You can copy and paste entire piping material classes. For more information, see *Copy Piping Material Classes within the same Catalog* (on page 89).
- You can copy and paste entire piping material class rules from one piping material class to another piping material class. You cannot, however, copy and paste individual rows of data between the same rule in two different piping material classes. For more information, see *Copy Piping Material Classes Rules within the same Catalog* (on page 89).

Structure

When copying and pasting structural data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Copying and Pasting between Test and Production Catalogs

When copying and pasting between your test catalog and your production catalog, you must ensure that both catalogs have the same schema. This means that the same object classes exist and that the object classes have the same properties defined for them. The exact content of the catalog for the object classes do not have to be the same.

General Considerations

When copying and pasting between two catalogs, you must:

▪ Copy and paste the select lists first. Most all other catalog data relies on the select lists being there. Trying to copy and paste other data before the select lists are present in the catalog will cause errors. For more information, see *Copy All Select Lists between Two Catalogs* (on page 90).

▪ Copy and paste part classes and interfaces before you copy and paste parts.

▪ The folder in the production catalog where data is pasted must match the folder in the test catalog from where the data was copied.

Cableway and Cable Trays

When copying and pasting cableway and cable tray data between your test catalog and your production catalog, remember that:

▪ You can copy and paste cable tray parts only as a whole.

▪ You can copy cableway and cable tray specifications either individually or as a whole. For more information, see *Copy Cableway Specifications between Two Catalogs* (on page 94) and *Copy Cable Tray Specifications between Two Catalogs* (on page 94).

Conduit

When copying and pasting conduit data between your test catalog and your production catalog, remember that:

▪ You can copy and paste conduit parts only as a whole.

▪ You can copy and paste conduit specifications either individually or as a whole. For more information, see *Copy Conduit Specifications between Two Catalogs* (on page 95).

Equipment

When copying and pasting equipment part data between your test catalog and your production catalog, remember that:

▪ You can copy and paste equipment parts as a whole or by part class between the two catalogs.

Modules

When copying and pasting Modules between your test catalog and your production catalog, remember that:

- You can only copy and paste module classes as a whole. You cannot copy and paste individual modules under the module class folder.

- Using **Tools > Open Reference Catalog**, you must open the catalog from which to copy the module class. After copying the module class from the referenced Catalog, you can paste that module class into the production catalog.

Piping

When copying and pasting piping data between your test catalog and your production catalog, remember that:

- You can copy and paste only entire piping material classes. You cannot copy and paste individual piping material class rules between the two catalogs. For more information, see *Copy Piping Material Classes between Two Catalogs* (on page 91).

- You can copy and paste Model Rules only as a whole (all the model rules at the same time). You cannot copy and paste individual model rules, such as the Fluid Density Rule for example, between the two catalogs. For more information, see *Copy Model Rules between Two Catalogs* (on page 91).

- You can copy and paste Generic Dimensional Data only as a whole. You cannot copy and paste only the Bolted End Data or only the Female End Data for example, between the two catalogs. For more information, see *Copy Piping Generic Dimensional Data between Two Catalogs* (on page 91).

- You can copy and paste Insulation data only as a whole. You cannot copy and paste only the Materials or only the Specifications data for example, between the two catalogs. For more information, see *Copy Piping Insulation between Two Catalogs* (on page 92).

- You can copy and paste Pipe Bending Data only as a whole. You cannot copy and paste only the Piping Bending Die Data or only the Pipe Bending Machine Data for example, between the two catalogs. For more information, see *Copy Piping Bending Data between Two Catalogs* (on page 92).

- You can copy and paste Tap Property Data between two catalogs. For more information, see *Copy Tap Property Data between Two Catalogs* (on page 92).

- You can copy and paste piping parts only as a whole.

- Piping specification notes data must be copied and pasted last (after select lists, the piping root folder, non-part data, and part data).

Structure

When copying and pasting structure data between your test catalog and your production catalog, remember that:

- You can copy and paste Structure Objects only as a whole. You cannot copy and paste individual part classes under the objects node. For example, you cannot copy and paste the Structure > Objects > Ladders node between the two catalogs. For more information, see *Copy Structure Objects between Two Catalogs* (on page 93).

- You can copy and paste Structure Materials data only as a whole. You cannot copy and paste just Material Properties or just Plate Thickness between two catalogs. For more information, see *Copy Structure Material between Two Catalogs* (on page 94).

Select Lists

You can copy and paste all the select lists or individual select lists between the two catalogs. For more information, see *Copy All Select Lists between Two Catalogs* (on page 90) and *Copy Individual Select List between Two Catalogs* (on page 90).

Copy Command

Copies the selected data and its associated relationships to the Clipboard. The copied data replaces the previous contents of the Clipboard. The Clipboard retains the format of the copied data as required until you paste it using the **Paste** command. Be sure to review *Copying and Pasting* (on page 81) for important information because the copy command is not available in some situations.

The copy command is available from the menu by selecting **Edit > Copy**, from the ribbon bar by clicking ⓔ, and from by keyboard by pressing **CTRL+C**.

Copying and Pasting within the same Catalog

You can copy and paste many types of catalog data within the same catalog.

General Considerations

When copying and pasting within the same catalog, you can:

- Copy and paste individual cells in the grid view from one row to another row.
- Copy and paste an entire row in the grid view to create a new row in the same grid.

Cableway and Cable Trays

When copying and pasting cableway and cable tray data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Conduit

When copying and pasting conduit data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Equipment

When copying and pasting equipment data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Piping

When copying and pasting piping data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item defined by a new commodity code.
- You can copy and paste entire piping material classes. For more information, see *Copy Piping Material Classes within the same Catalog* (on page 89).

- You can copy and paste entire piping material class rules from one piping material class to another piping material class. You cannot, however, copy and paste individual rows of data between the same rule in two different piping material classes. For more information, see *Copy Piping Material Classes Rules within the same Catalog* (on page 89).

Structure

When copying and pasting structural data within the same catalog, remember that:

- You can copy and paste entire part definitions (all sizes) to a new item.

Copying and Pasting between Test and Production Catalogs

When copying and pasting between your test catalog and your production catalog, you must ensure that both catalogs have the same schema. This means that the same object classes exist and that the object classes have the same properties defined for them. The exact content of the catalog for the object classes do not have to be the same.

General Considerations

When copying and pasting between two catalogs, you must:

- Copy and paste the select lists first. Most all other catalog data relies on the select lists being there. Trying to copy and paste other data before the select lists are present in the catalog will cause errors. For more information, see *Copy All Select Lists between Two Catalogs* (on page 90).

- Copy and paste part classes and interfaces before you copy and paste parts.

- The folder in the production catalog where data is pasted must match the folder in the test catalog from where the data was copied.

Cableway and Cable Trays

When copying and pasting cableway and cable tray data between your test catalog and your production catalog, remember that:

- You can copy and paste cable tray parts only as a whole.

- You can copy cableway and cable tray specifications either individually or as a whole. For more information, see *Copy Cableway Specifications between Two Catalogs* (on page 94) and *Copy Cable Tray Specifications between Two Catalogs* (on page 94).

Conduit

When copying and pasting conduit data between your test catalog and your production catalog, remember that:

- You can copy and paste conduit parts only as a whole.

- You can copy and paste conduit specifications either individually or as a whole. For more information, see *Copy Conduit Specifications between Two Catalogs* (on page 95).

Equipment

When copying and pasting equipment part data between your test catalog and your production catalog, remember that:

- You can copy and paste equipment parts as a whole or by part class between the two catalogs.

Modules

When copying and pasting Modules between your test catalog and your production catalog, remember that:

- You can only copy and paste module classes as a whole. You cannot copy and paste individual modules under the module class folder.

- Using **Tools > Open Reference Catalog**, you must open the catalog from which to copy the module class. After copying the module class from the referenced Catalog, you can paste that module class into the production catalog.

Piping

When copying and pasting piping data between your test catalog and your production catalog, remember that:

- You can copy and paste only entire piping material classes. You cannot copy and paste individual piping material class rules between the two catalogs. For more information, see *Copy Piping Material Classes between Two Catalogs* (on page 91).

- You can copy and paste Model Rules only as a whole (all the model rules at the same time). You cannot copy and paste individual model rules, such as the Fluid Density Rule for example, between the two catalogs. For more information, see *Copy Model Rules between Two Catalogs* (on page 91).

- You can copy and paste Generic Dimensional Data only as a whole. You cannot copy and paste only the Bolted End Data or only the Female End Data for example, between the two catalogs. For more information, see *Copy Piping Generic Dimensional Data between Two Catalogs* (on page 91).

- You can copy and paste Insulation data only as a whole. You cannot copy and paste only the Materials or only the Specifications data for example, between the two catalogs. For more information, see *Copy Piping Insulation between Two Catalogs* (on page 92).

- You can copy and paste Pipe Bending Data only as a whole. You cannot copy and paste only the Piping Bending Die Data or only the Pipe Bending Machine Data for example, between the two catalogs. For more information, see *Copy Piping Bending Data between Two Catalogs* (on page 92).

- You can copy and paste Tap Property Data between two catalogs. For more information, see *Copy Tap Property Data between Two Catalogs* (on page 92).

- You can copy and paste piping parts only as a whole.

- Piping specification notes data must be copied and pasted last (after select lists, the piping root folder, non-part data, and part data).

Structure

When copying and pasting structure data between your test catalog and your production catalog, remember that:

- You can copy and paste Structure Objects only as a whole. You cannot copy and paste individual part classes under the objects node. For example, you cannot copy and paste the

Structure > Objects > Ladders node between the two catalogs. For more information, see *Copy Structure Objects between Two Catalogs* (on page 93).

- You can copy and paste Structure Materials data only as a whole. You cannot copy and paste just Material Properties or just Plate Thickness between two catalogs. For more information, see *Copy Structure Material between Two Catalogs* (on page 94).

Select Lists

You can copy and paste all the select lists or individual select lists between the two catalogs. For more information, see *Copy All Select Lists between Two Catalogs* (on page 90) and *Copy Individual Select List between Two Catalogs* (on page 90).

What do you want to do?

- *Copy Part Classes within the same Catalog* (on page 89)
- *Copy Piping Material Classes within the same Catalog* (on page 89)
- *Copy Piping Material Classes Rules within the same Catalog* (on page 89)
- *Open Two Catalogs* (on page 90)
- *Copy Individual Select List between Two Catalogs* (on page 90)
- *Copy All Select Lists between Two Catalogs* (on page 90)
- *Copy Model Rules between Two Catalogs* (on page 91)
- *Copy Piping Material Classes between Two Catalogs* (on page 91)
- *Copy Piping Generic Dimensional Data between Two Catalogs* (on page 91)
- *Copy Piping Insulation between Two Catalogs* (on page 92)
- *Copy Piping Bending Data between Two Catalogs* (on page 92)
- *Copy Tap Property Data between Two Catalogs* (on page 92)
- *Copy Structure Objects between Two Catalogs* (on page 93)
- *Copy Modules between Two Catalogs* (on page 93)
- *Copy Structure Material between Two Catalogs* (on page 94)
- *Copy Cable Tray Specifications between Two Catalogs* (on page 94)
- *Copy Cableway Specifications between Two Catalogs* (on page 94)
- *Copy Conduit Specifications between Two Catalogs* (on page 95)

Copy Part Classes within the same Catalog

1. Expand the tree view to and select the destination node for the new part class.

2. Click **Catalog > New > Class**.

3. Click **Copy From**.

4. Select the part class to copy from the list of existing part classes.

5. Optional, select the **Include all parts defined for this part class** option if you want to copy the parts.

6. Click **OK** on the **Copy From** dialog box.

7. In the **Name** box, type a new name for the part class.

8. Edit any definition or occurrence values as needed.

9. Click **OK** on the **New Class** dialog box.

Copy Piping Material Classes within the same Catalog

1. Expand the tree view to Piping\Piping Specifications\Piping Material Classes.

2. Select the Piping Material Class node in the tree view to copy. For example, the 1C0031 node.

3. Click **Copy** .

4. Click **Paste** .

5. Type a name for the new piping material class, and then click **OK**.

Copy Piping Material Classes Rules within the same Catalog

1. Expand the tree view to Piping\Piping Specifications\Piping Material Classes\<source spec name>\Piping Materials Class Rules.

2. Select the Piping Material Class rule node in the tree view to copy. For example, the Joint Quality Factor node.

3. Click **Copy** .

4. Expand the tree view to Piping\Piping Specifications\Piping Material Classes\<target spec name>\Piping Materials Class Rules.

5. Select the Piping Material Class target rule node. To continue the above example, you would select the Joint Quality Factor node.

6. Click **Paste** .

7. Click **Yes** to confirm that you want to overwrite the existing rule data.

NOTE You cannot copy and paste individual rows of a rule between piping material classes.

Open Two Catalogs

Before you can copy and paste between two catalogs, you must have both catalogs open.

1. Open **Project Management**.

2. Create a catalog following the steps in the **Project Management** documentation topic titled "Create a New Catalog".

3. After you have created the new catalog and have associated a Model with the new catalog, exit the **Project Management** environment.

4. Open and create a new session file.

5. When defining your workspace, select the Model that you created in step 3.

6. Click **Tasks > Catalog**.

7. Click **Catalog > Save As** to save the session file.

8. Repeat steps 1 through 7 to create the second catalog.

9. Open both session files.

Copy Individual Select List between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the Select Lists node in the tree view

3. Select the select list node to copy.

4. Click **Copy** .

5. In the target catalog, select the Select Lists node in the tree view.

6. Click **Paste** .

Copy All Select Lists between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, select the Select Lists node in the tree view

3. Click **Copy** .

4. In the target catalog, select the Select Lists node in the tree view.

5. Click **Paste** .

NOTE Because of the large amount of data in the select lists, the paste operation can take up to one hour to complete.

Copy Model Rules between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. Expand the tree views in both catalogs to **Piping > Piping Specification > Model Rules**.

3. In the source catalog, select the **Model Rules** node in the tree view.

4. Click **Copy** .

5. In the target catalog, select the **Model Rules** node in the tree view.

6. Click **Paste** .

 NOTE You cannot copy and paste individual model rules, such as the Fluid Density Rule, between catalogs.

Copy Piping Material Classes between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the tree view to Piping\Piping Specifications\Piping Material Classes.

3. Select the Piping Material Class node in the tree view to copy. For example, the FC0405 node.

4. Click **Copy** .

5. In the target catalog, expand the tree view to Piping\Piping Specifications\Piping Material Classes.

6. Select the Piping Material Classes node.

7. Click **Paste** .

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

9. Click **OK** on the **Paste** dialog box.

Copy Piping Generic Dimensional Data between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the Piping node in the tree view.

3. Select the Generic Dimensional Data node.

4. Click **Copy** .

5. In the target catalog, expand the Piping node in the tree view.

6. Select the Generic Dimensional Data node.

7. Click **Paste** .

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

📝 NOTE Because of the amount of data involved, the paste can take several minutes to process.

Copy Piping Insulation between Two Catalogs

1. Open both catalogs.

    Open Two Catalogs (on page 90)

2. In the source catalog, expand the Piping node in the tree view.

3. Select the Insulation node.

4. Click **Copy** 📋.

5. In the target catalog, expand the Piping node in the tree view.

6. Select the Insulation node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Piping Bending Data between Two Catalogs

1. Open both catalogs.

    Open Two Catalogs (on page 90)

2. In the source catalog, expand the Piping node in the tree view.

3. Select the Pipe Bending Data node.

4. Click **Copy** 📋.

5. In the target catalog, expand the Piping node in the tree view.

6. Select the Pipe Bending Data node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Tap Property Data between Two Catalogs

1. Open both catalogs.

    Open Two Catalogs (on page 90)

2. In the source catalog, expand the Piping node in the tree view.

3. Select the Tap Property Data node.

4. Click **Copy** 📋.

5. In the target catalog, expand the Piping node in the tree view.

6. Select the Tap Property Data node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Modules between Two Catalogs

1. Open **Project Management**, and create a catalog following the steps in the **Project Management** documentation topic titled "Create a New Catalog".

2. After you have created the new catalog and have associated a Model with the new catalog, exit the **Project Management** environment.

3. Open and create a new session file.

4. When defining your workspace, select the Model that you associated the catalog to in step 3.

5. Click **Tasks > Catalog**.

6. Click **Catalog > Save As** to save the session file.

7. Click **Tools > Open Referenced Catalog**.

8. Select the database provider type.

9. Enter the site database server name and the site database name as the active site.

10. Select the catalog that you want to reference in the **Select Reference Catalog** box, and then click **OK**.

11. In the source catalog, expand the tree view to Modules.

12. Select the Modules sub-node in the tree view to copy. For example, the Modules > Equipment > Conveyor System.

13. Click **Copy** 📋.

14. In the target catalog, expand the tree view to Modules.

15. Select the corresponding sub-node.

16. Click **Paste** 📋.

17. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

18. Click **OK** on the **Paste** dialog box.

⭐ **IMPORTANT** You can only copy from the referenced catalog into the active session catalog. You cannot copy from the active session catalog into the referenced catalog.

Copy Structure Objects between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the Structure node in the tree view.

3. Select the Objects node.

4. Click **Copy** 📋.

5. In the target catalog, expand the Structure node in the tree view.

6. Select the Objects node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

📝 NOTE You must copy and paste Structural Objects as a whole.

Copy Structure Material between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the Structure node in the tree view.

3. Select the Materials node.

4. Click **Copy** 📋.

5. In the target catalog, expand the Structure node in the tree view.

6. Select the Materials node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Cable Tray Specifications between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the tree view to Cableways\Specifications.

3. Select the Cable Tray Specification node in the tree view.

4. Click **Copy** 📋.

5. In the target catalog, expand the tree view to Cableways\Specifications.

6. Select the Cable Tray Specification node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Cableway Specifications between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the tree view to Cableways\Specifications\Cable Way Specifications.

3. Select the specification node in the tree view to copy. For example, the Cws-0 node.

4. Click **Copy** 📋.

5. In the target catalog, expand the tree view to Cableways\Specifications\Cable Way Specifications

6. Select the Cable Way Specifications node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Copy Conduit Specifications between Two Catalogs

1. Open both catalogs.

   Open Two Catalogs (on page 90)

2. In the source catalog, expand the tree view to Conduit\Specifications.

3. Select the specification node in the tree view to copy. For example, the CS0 node.

4. Click **Copy** 📋.

5. In the target catalog, expand the tree view to Conduit\Specifications.

6. Select the Specifications node.

7. Click **Paste** 📋.

8. Click **Yes** to confirm that you want to overwrite the data in the target catalog.

Paste Command

📋 Inserts the Clipboard contents to the selected node. Be sure to review *Copying and Pasting* (on page 81) for important information because the paste command is not available in some situations.

The paste command is available on the menu by selecting **Edit > Paste**, on the ribbon by clicking 📋, and on the keyboard by pressing **CTRL+V**.

Copy Filters from Catalog Command

Allows you to copy all filters from a user-specified Catalog database to the current active Catalog database. You also must specify the residing server on which the Catalog and Catalog schema databases reside. The **Copy Filters from Catalog** command is available only on the **Tools** menu.

Many tasks within the environment rely on filters. You can use the **Tools > Copy Filters from Catalog** command to copy all filters from one Catalog database to the current active Catalog database.

Copy Filters from Catalog Dialog Box **(on page 978)**

What do you want to do?

- *Copy Filters From One Catalog to Another* (on page 96)
- *Copying Filters Between Catalogs* (on page 96)

Copy Filters from One Catalog to Another

1. chelhayle7

2. In the **Catalog** task, click **Tools > Copy Filters from Catalog**.

   💡 **TIP** To switch to the **Catalog** task from another environment, click **Tasks > Catalog**.

3. In the **Copy Filters from Catalog** dialog box, use the **Provider type** list to specify the data management system you are using.

4. Use the **Database** section to specify the residing SQL Server location or Oracle net service connection and database name of the Catalog database from which you want to copy filters.

5. Use the **Metadata** section to specify the residing SQL Server location or Oracle net service connection and database name of the Catalog schema database from which you want to copy filters.

6. Click **OK**.

Copying Filters between Catalogs

Many tasks within the environment rely on filters. You can use the **Tools > Copy Filters from Catalog** command to copy all filters from one Catalog database to the current active Catalog database.

See Also
Copy Filters From One Catalog to Another (on page 96)

Engineering Check Reports

Engineering check reports are an excellent way for administrators to review and approve the reference data in your catalog. For example, you would want to run engineering check reports on your test catalog, review, and then approve the reports before moving that data to your live catalog. For more information on moving reference data between catalogs, see *Managing Catalog Changes* (on page 43).

Engineering check reports are also useful for saving reference data that has been created or modified in the Catalog environment back into a Microsoft Excel workbook. After the reference data is saved to an engineering check report, you can archive the Excel workbook for use later, edit the reference data and then re-bulkload the workbook, or bulkload the workbooks to another catalog. You can also use engineering check reports to move data between Oracle and Microsoft SQL Server catalog databases.

The engineering check reports are available from the **Tools > Run Report** command, on the **Catalog Reports** tab.

For a complete listing of all the available engineering check reports, refer to the workbooks in the following folder on the SharedContent share: \\[*ProductFolder*]\SharedContent\Reports\Types of Reports\Catalog EngineeringChecks. For more information, see *Engineering Check Reports: Piping Parts* (on page 97).

Engineering Check Reports: Piping Parts

You must select the correct engineering check report for the piping part class. Find the piping part class name in the first column, then look in the third column for the name of the engineering check report to select. This table is sorted by the piping part class name:

Part Class	Piping Commodity Type	Engineering Check Report Name
11_25DegElbow	11.25 degree elbow	Piping Part Data M002
180DegReturn	180 degree long radius return	Piping Part Data M002
22_5DegElbow	22.5 degree elbow	Piping Part Data M002
30DegAsymElbow	30 degree elbow	Piping Part Data M011
30DegSymElbow	30 degree elbow	Piping Part Data M007
3WayBall	3-way ball valve	Piping Part Data V017
3WayBallValve	3-way ball valve	Piping Part Data V016
45Deg3DElbow	45 degree elbow, 3D	Piping Part Data M003

Part Class	Piping Commodity Type	Engineering Check Report Name
45DegAsymElbow	45 degree elbow, long radius long tangent	Piping Part Data M012
45DegElbow	45 degree elbow	Piping Part Data M002
45DegLRElbow	45 degree elbow, long radius	Piping Part Data M003
45DegLTElbow	45 degree elbow, long radius long tangent	Piping Part Data M010
45DegStreetElbow	45 degree elbow, street	Piping Part Data M015
45DegSymElbow	45 degree elbow, long radius long tangent	Piping Part Data M006
45DegUnionElbow	45 degree elbow, union	Piping Part Data M016
5_625DegElbow	5.625 degree elbow	Piping Part Data M002
60DegAsymElbow	60 degree elbow	Piping Part Data M013
60DegElbow	60 degree elbow	Piping Part Data M002
60DegSymElbow	60 degree elbow	Piping Part Data M007
90Deg3DElbow	90 degree elbow, 3D	Piping Part Data M003
90DegAsymElbow	90 degree elbow, long radius long tangent	Piping Part Data M010
90DegElbow	90 degree elbow	Piping Part Data M002
90DegLRElbow	90 degree elbow, long radius	Piping Part Data M003
90DegLTElbow	90 degree elbow, long radius long tangent	Piping Part Data M010
90DegRedElbow	90 degree reducing elbow	Piping Part Data M004
90DegRedStreetElbow	90 degree reducing street elbow	Piping Part Data M017
90DegReducingElbow	90 degree reducing elbow	Piping Part Data M005
90DegReducingYBranch	90 degree reducing short Y-branch	Piping Part Data M022
90DegSRElbow	90 degree elbow, short radius	Piping Part Data M003

Part Class	Piping Commodity Type	Engineering Check Report Name
90DegStreetElbow	90 degree elbow, street	Piping Part Data M015
90DegSymElbow	90 degree elbow, long radius long tangent	Piping Part Data M006
90DegUnionElbow	90 degree elbow, union	Piping Part Data M016
90DegYBranch	90 degree short Y-branch	Piping Part Data M022
AngleCheckValve	Angle check valve	Piping Part Data V002
AngleGlobeValve	Angle blowdown valve	Piping Part Data V002
AngleGlobeValve_Asym	Angle blowdown valve	Piping Part Data V003
AngleHoseValve	Angle hose valve	Piping Part Data V007
AngleStopCheckValve	Angle stop check valve	Piping Part Data V002
AngleValve	Angle valve	Piping Part Data V008
AngleValve45Deg	Angle Valve	Piping Part Data V002
AutoRecirculationValve	Automatic re-circulation valve	Piping Part Data V005
BallValve	Ball valve long pattern	Piping Part Data V001
BallValve_m	Ball valve reduced port	Piping Part Data V012
BasinCross	Basin cross	Piping Part Data M035
BlankDisc	Blank disc	Piping Part Data M056
BlindFlange	Blind flange	Piping Part Data F001
BlindFlange_m	Blind flange	Piping Part Data F001
Bushing	Bushing	Piping Part Data M056
ButterflyValve	Butterfly valve low pressure	Piping Part Data V001
ButterflyValve_m	Butterfly valve high pressure	Piping Part Data V009
ButterflyValveArmLength	Butterfly valve low pressure	Piping Part Data V010
ButterflyValveOperHgt	Butterfly valve low pressure	Piping Part Data V011

Part Class	Piping Commodity Type	Engineering Check Report Name
Cap	Cap	Piping Part Data M001
CAPTC	Cap	Piping Part Data F001
CheckValve	Check valve reduced port	Piping Part Data V001
CheckValve_Fem	Check valve reduced port swing type	Piping Part Data V001
CheckValveSwing	Check valve swing type	Piping Part Data V001
CKL	Check valve, horizontal lift	Piping Part Data V013
ClampHDHWN_TriClover	Clamp, Tri-Clamp	Piping Part Data M050
ConcentricReducer	Concentric reducer	Piping Part Data M056
ConcentricReducer_m	Concentric reducer	Piping Part Data M056
ConcentricSwage	Concentric swage	Piping Part Data M056
ConduitGateValve	Gate valve, through-conduit	Piping Part Data V006
Coupling	Coupling	Piping Part Data M056
Coupling_m	Coupling	Piping Part Data M056
Coupling_PDB	Coupling	Piping Part Data M047
Cross	Cross	Piping Part Data M035
DIA	Diaphragm valve	Piping Part Data V001
DIALT	Diaphragm valve	Piping Part Data V004
DIAMM	Diaphragm valve	Piping Part Data V004
DIAWM	Diaphragm valve	Piping Part Data V004
DistancePiece	Distance piece	Piping Part Data P001
DripRingTee	Drip ring tee	Piping Part Data M025
E225MiterNCut	22.5 degree elbow, 1-cut mitered	Piping Part Data M014
E30MiterNCut	30 degree elbow, 1-cut mitered	Piping Part Data M014

Part Class	Piping Commodity Type	Engineering Check Report Name
E45	45 degree elbow	Piping Part Data M002
E45LRRJ	45 degree elbow, long radius	Piping Part Data M003
E45LT	45 degree elbow, long radius long tangent	Piping Part Data M007
E45MiterNCut	45 degree elbow, 1-cut mitered	Piping Part Data M014
E45TC	45 degree elbow	Piping Part Data M002
E60MiterNCut	60 degree elbow, 1-cut mitered	Piping Part Data M014
E90	90 degree elbow	Piping Part Data M002
E90LRRJ	90 degree elbow, long radius	Piping Part Data M003
E90LT	90 degree elbow, long radius long tangent	Piping Part Data M007
E90MiterNCut	90 degree elbow, 1-cut mitered	Piping Part Data M014
E90TC	90 degree elbow, Hygienic Clamp Joint	Piping Part Data M002
EccentricReducer	Eccentric reducer	Piping Part Data M057
EccentricReducer_m	Eccentric reducer	Piping Part Data M057
EccentricSwage	Eccentric swage	Piping Part Data M057
Elbolet	Elbolet for long radius elbow	Piping Part Data M056
Elbolet_m	Elbolet for long radius elbow	Piping Part Data M056
Elbow45Deg	45 degree elbow	Piping Part Data M003
Elbow90Deg	90 degree elbow	Piping Part Data M003
ElevatedFireMonitorTy1	Elevated type fire monitor	Piping Part Data M039
ElevatedFireMonitorTy2	Elevated type fire monitor	Piping Part Data M041
Endolet	Endolet	Piping Part Data M056
Endolet_m	Endolet	Piping Part Data M056

Part Class	Piping Commodity Type	Engineering Check Report Name
FBLD	Blind flange	Piping Part Data F001
FERR	Ferrule	Piping Part Data M056
FireHydrant	Dry barrel type hydrant	Piping Part Data M040
FlangeConnectionPiece	Flanged connecting piece	Piping Part Data M056
FlangOlet	Nippolet	Piping Part Data M034
FRFILR	Reducing filler flange	Piping Part Data F003
GateValve	Gate valve	Piping Part Data V001
GateValve_Asym	Gate valve reduced port	Piping Part Data V003
GateValve_m	Gate valve	Piping Part Data V004
GateValveAngleOp	Gate valve	Piping Part Data V014
GlobeValve	Globe valve	Piping Part Data V001
GlobeValve_Asym	Globe valve reduced port	Piping Part Data V003
GlobeValve_m	Globe valve	Piping Part Data V004
HalfCoupling	Half coupling	Piping Part Data M049
HoseConnection	Hose connection	Piping Part Data M056
HoseRackStation	Hose Rack	Piping Part Data M043
Hub	Hub	Piping Part Data M056
InstrumentTee	Short Outlet Run Tee	Piping Part Data M030
KnifeGateValve	Knife gate valve	Piping Part Data V003
LapJointFlange	Lap joint flange with stub end	Piping Part Data F004
LapJointFlange_m	Lap joint flange	Piping Part Data F004
LAT	Lateral	Piping Part Data M031
Lateral	Lateral	Piping Part Data M022

Part Class	Piping Commodity Type	Engineering Check Report Name
Latrolet	Latrolet	Piping Part Data M056
LongWeldNeckFlange	Long weld neck flange	Piping Part Data M056
Monitor	Station type monitor	Piping Part Data M042
MultiportDia2WayG	2-way diaphragm diverter valve	Piping Part Data V018
MultiportDia3Way	3-way diaphragm diverter valve	Piping Part Data V019
MultiportDia4Way	4-way diaphragm diverter valve	Piping Part Data V021
MultiportDia4WayG	4-way diaphragm diverter valve	Piping Part Data V020
MultiportDia7WayG	7-way diaphragm diverter valve	Piping Part Data V022
Nipple	Nipple	Piping Part Data M056
OletGateValve	Extended body gate valve	Piping Part Data V015
OnBranchUnionTee	On-branch union tee	Piping Part Data M029
OnRunUnionTee	On-run union tee	Piping Part Data M029
OrificeFlange	Weld neck orifice flange	Piping Part Data F005
OrificeFlangewithTwoTaps	Weld neck orifice flange	Piping Part Data F006
Paddle	Paddle spacer	Piping Part Data M055
PlateFlange	Plate flange	Piping Part Data F002
Plug	Plug	Piping Part Data M001
PlugValve	Plug valve short pattern	Piping Part Data V001
REDC	Concentric reducer	Piping Part Data M056
REDCLT	Concentric reducer Extended Tangent	Piping Part Data M056
REDCMM	Concentric reducer	Piping Part Data M056
RedCoupling	Coupling, Victaulic	Piping Part Data M048
REDCRJ	Concentric reducer	Piping Part Data M056

Part Class	Piping Commodity Type	Engineering Check Report Name
REDE	Eccentric reducer	Piping Part Data M057
REDELT	Eccentric reducer Extended Tangent	Piping Part Data M056
REDEMM	Eccentric reducer	Piping Part Data M057
REDERJ	Eccentric reducer	Piping Part Data M057
ReducingBranchCross	Reducing branches cross	Piping Part Data M035
ReducingFlange	Threaded reducing flange	Piping Part Data M056
ReducingInsert	Reducing insert Type 1	Piping Part Data M056
ReducingInstrumentTee	Reducing instrument tee	Piping Part Data M025
ReducingLateral	Reducing branch lateral	Piping Part Data M020
ReducingLateral	Reducing branch lateral	Piping Part Data M022
ReducingRunAndBranchTee	Reducing run and branch tee	Piping Part Data M021
ReducingRunBrnchCross	Reducing run and branches cross	Piping Part Data M035
ReducingRunBrnchLateral	Reducing run and branch lateral	Piping Part Data M022
ReducingTee	Reducing branch tee	Piping Part Data M020
ReducingTee_m	Reducing branch tee	Piping Part Data M020
ReducingTeeWye	Reducing run and branch tee	Piping Part Data M028
ReinforcingPad	Stub-on reinforcing pad	Piping Part Data M037
ReinforcingPad_m	Stub-on reinforcing pad	Piping Part Data M037
ReinforcingPadNonRadial	Non-radial reinforcing pad	Piping Part Data M038
SlipOnFlange	Slip-on flange	Piping Part Data M056
SlipOnFlange_m	Slip-on flange	Piping Part Data F002
SlipOnReducingFlange	Slip-on reducing flange	Piping Part Data F002
SocketFlange	Socket flange	Piping Part Data M056

Part Class	Piping Commodity Type	Engineering Check Report Name
SocketweldFlange	Socket weld flange	Piping Part Data M056
Sockolet	Sockolet reducing	Piping Part Data M032
Sockolet_m	Sockolet reducing	Piping Part Data M032
SPACER	Ring spacer	Piping Part Data M054
SpectacleBlind	Spectacle blind	Piping Part Data M045
Sprinkler	Spray sprinkler	Piping Part Data M044
StopCheckValve	Stop check valve	Piping Part Data V001
StreetTee	Street tee	Piping Part Data M022
StubEnd	Stub end long	Piping Part Data M046
Sweepolet	Sweepolet	Piping Part Data M033
T	Tee	Piping Part Data M021
TankDrainValve	Tank drain valve	Piping Part Data V002
TechlokClamp	Clamp, Techlok	Piping Part Data M051
Tee	Tee	Piping Part Data M021
Tee_m	Tee	Piping Part Data M021
Tee_PDB	Tee	Piping Part Data M024
TeeWye	Tee wye	Piping Part Data M028
TFI	Full size instrument tee	Piping Part Data M025
ThreadedFlange	Threaded flange	Piping Part Data M056
Thredolet	Thredolet reducing	Piping Part Data M032
Thredolet_m	Thredolet reducing	Piping Part Data M032
TLT	Tee	Piping Part Data M021
TMMM	Tee	Piping Part Data M021

Part Class	Piping Commodity Type	Engineering Check Report Name
TMMMS	Tee	Piping Part Data M020
TMSWMS	Tee	Piping Part Data M023
TRB	Reducing branch tee	Piping Part Data M020
TRI	Reducing instrument tee	Piping Part Data M025
TrimmableReducingTee	Reducing branch tee	Piping Part Data M027
TrimmableTee	Tee	Piping Part Data M026
TrimSymElbowType1	90 degree elbow, long radius long tangent	Piping Part Data M008
TrimSymElbowType2	90 degree elbow, long radius long tangent	Piping Part Data M009
TRJ	Tee	Piping Part Data M021
TRLT	Reducing branch tee	Piping Part Data M020
TRMMM	Reducing branch tee	Piping Part Data M020
TRMMMS	Reducing branch tee	Piping Part Data M020
TRUBWWM	180 degree return with Use-Point	Piping Part Data M018
TrueY	True Y	Piping Part Data M020
TrueY2FC	True Y	Piping Part Data M020
TrueY3FC	True Y	Piping Part Data M022
TRUSWWM	180 degree return with Use-Point on Side offset	Piping Part Data M019
TRWWM	Reducing branch tee	Piping Part Data M020
TRWWMS	Reducing branch tee	Piping Part Data M020
TWMSW	Short Outlet Run Tee	Piping Part Data M023
TWMW	Tee	Piping Part Data M023
TWWM	Tee	Piping Part Data M020

Part Class	Piping Commodity Type	Engineering Check Report Name
TWWMS	Tee	Piping Part Data M020
Union	Union	Piping Part Data M053
UnionHead	Union head	Piping Part Data M056
UnionTail	Union tail	Piping Part Data M056
VE45	45 degree elbow	Piping Part Data M002
VE90Elbow	90 degree elbow	Piping Part Data M002
VictaulicClamp	Victaulic Clamp	Piping Part Data M052
VictaulicT	Tee	Piping Part Data M021
VPSCoupling	Coupling, Victaulic	Piping Part Data M056
VPSElbow45Deg	45 degree elbow	Piping Part Data M002
VPSElbow90Deg	90 degree elbow	Piping Part Data M002
VPSTee	Tee	Piping Part Data M021
VREDC	Concentric reducer	Piping Part Data M056
VREDE	Eccentric reducer	Piping Part Data M057
WaferCheckValve	Wafer check valve	Piping Part Data V001
WeldNeckExpanderFlange	Weld neck expander flange	Piping Part Data M056
WeldNeckFlange	Weld neck flange	Piping Part Data M056
WeldNeckFlange_m	Weld neck flange	Piping Part Data M056
Weldolet	Weldolet reducing	Piping Part Data M032
Weldolet_m	Weldolet reducing	Piping Part Data M032
WeldoletNonRadial	Non-radial weldolet	Piping Part Data M002
WOSteamTrap	Steam trap	Piping Part Data S001
WOSteamTrap3	Steam trap	Piping Part Data S002

Part Class	Piping Commodity Type	Engineering Check Report Name
XLT	Cross	Piping Part Data M035
XMMMM	Cross	Piping Part Data M035
XRLT	Reducing branches cross	Piping Part Data M036
XRMMMM	Reducing branches cross	Piping Part Data M036
Y	True Y	Piping Part Data M031

See Also
Engineering Check Reports (on page 97)

Creating Piping Part Class Reports

You can modify your catalog data in either the **Catalog** task or in Microsoft Excel workbooks, which you can then bulkload into the Catalog database. Using the Engineering Check Reports, you can export your piping part data from the Catalog database back into Excel workbooks for editing. You can then bulkload the edited workbook back into the original Catalog database or another Catalog database.

Because piping part classes can be customized, a master piping part class report template is delivered with the software. You must copy and edit this master piping part class report template for each piping part class that you want to report on using the Engineering Check Reports. The master piping part class report template is based on the "ButterflyValve" part class, and is delivered in *[Reference Data Product Folder]*\SharedContent\Reports\Types of Reports\Catalog Engineering Checks-lat\Piping\Master Piping Part Data folder on the reference data server. The files in that folder are:

Butterfly Valve.rfp
Butterfly Valve.rfm
Butterfly Valve.rdy
Butterfly Valve.rtp
Butterfly Valve1.rqp
Butterfly Valve2.rqp
Butterfly Valve - Plant.rqe
Butterfly Valve - Part Data.rqe
Butterfly Valve.xls

Step 1: Copy and Rename Folder and Files

The first step in creating your piping part class report is to copy the master ButterflyValve template and rename the folder and files.

1. Create a copy of the master ButterflyValve report template folder in the Catalog Part Classes folder.

2. Rename the copied folder to be the name of your piping part class, for example "MyPartClass".

3. Rename all the files in the folder to be the name of you piping part class. For example, rename Butterfly Valve.rfp to be MyPartClass.rfp.

Step 2: Search and Replace Part Class Name in Files

The next step is to open the following files searching for "Butterfly Valve" and replacing that with the name of your piping part class.

MyPartClass.rfp
MyPartClass.rfm
MyPartClass.rdy
MyPartClass.rtp
MyPartClass1.rqp
MyPartClass2.rqp
MyPartClass - Plant.rqe

Step 3: Modify the MyPartClass - Part Data.rqe File

Open the "MyPartClass - Part Data.rqe" file searching for "Butterfly Valve" and replacing that with the name of your piping part class.

The MyPartClass - Part Data.rqe file contains the query to execute on the reports database. In the <SQL> tag is the sql query for SQLServer.

For a part class that has two ports, this file will have two sections like what is shown below. Correspondingly, a single port part class will have one section, and a three port part class will have three sections. Therefore, copy and paste the section in the file to match the number of ports that your part class has and then edit the trailing number (2, 3, 4 and so forth) accordingly.

```
--Port1 info
port1.endprep_shortvalue              'EndPreparation1',
port1.schedulethickness_shortvalue    'ScheduleThickness1',
port1.pressurerating_shortvalue       'PressureRating1',
port1.flowdirection_shortvalue        'FlowDirection1',
port1.endstandard_shortvalue          'EndStandard1',
port1.NPD                             'Npd1',
port1.NPDUnitType                    'NpdUnitType1',
port1.PipingPointBasis_shortvalue     'PipingPointBasis1',
port1.Id                             'Id1',
--Port2 info
port2.endprep_shortvalue              'EndPreparation2',
port2.schedulethickness_shortvalue    'ScheduleThickness2',
port2.pressurerating_shortvalue       'PressureRating2',
port2.flowdirection_shortvalue        'FlowDirection2',
port2.endstandard_shortvalue          'EndStandard2',
port2.NPD                             'Npd2',
port2.NPDUnitType                    'NpdUnitType2',
port2.PipingPointBasis_shortvalue     'PipingPointBasis2',
port2.Id                             'Id2',
```

The dimensional attributes start with a comment. Based on the number of dimensional attributes that your part class has, you need to add the corresponding statements. For example, if you are adding a new attribute named HandleAngle, then:

```
--Dimensional Attributes
PD1.FacetoFace        'FacetoFace'
PD1.HandleAngle       'HandleAngle'
```

For part classes with two ports, there will be two sections like what is shown below. Copy and paste (or delete) the section in the file to match the number of ports that your part class has and then edit the trailing number (2, 3, 4 and so forth) accordingly.

```
--port information
   JOIN XpartContainsNozzles rpn1 on rpn1.oidorigin = x1.oid
   LEFT JOIN JCatalogpipeport_CL port1 on (port1.oid =
rpn1.oiddestination and port1.PortIndex = 1)
   JOIN XpartContainsNozzles rpn2 on rpn2.oidorigin = x1.oid
   LEFT JOIN JCatalogpipeport_CL port2 on (port2.oid =
rpn2.oiddestination and port2.PortIndex = 2)
   JOIN XPartClassContainsParts x4 on (x4.oiddestination = x1.oid)
   JOIN JDPartClass x5 on (x5.oid = x4.oidorigin)
where x5.partclasstype like 'PipeComponentClass'
   and port1.oid is not null
   And port2.oid is not null
```

You should also make the same changes to the sql query for Oracle as you made for SQLServer.

Step 4: Modify the MyPartClass.xls File

Open the MyPartClass.xls file in Microsoft Excel and make the following changes:

1. Unhide all the rows in the butterflyvalve sheet.

2. Rename the butterflyvalve sheet to be MyPartClass.

3. Add any additional part class attributes. To continue the example from above, assume you need to add an attribute called HandleAngle.

   a. In an empty column at the end, add HandleAngle in row 8.

   b. In the same column in row 10, enter Handle Angle.

   c. In the same column in row 11, enter   #PartData::[lbl_HandleAngle]#

4. Edit the port information in rows 8, 10, and 11 to match number of ports that your part class has. Again, edit the trailing numbers (2, 3, 4, and so forth) accordingly.

	PipingPointBasis[1]	Id[1]	PressureRating[1]	EndPreparation[1]
8				
9				
10	**Piping Point Basis[1]**	**Id[1]**	**Pressure Rating[1]**	**End Preparation[1]**
11	#PartData::PipingPointBasis1#	#PartData::Id1#	#PartData::PressureRating1#	#PartData::EndPreparation1#

5. In the part class definition section, add the occurrence attributes of your MyPartClass part if needed.

OA:InsulationThickness	**OA:Rotation**
OA:InsulationThickness	OA:Rotation

6. In the part class definition section, define the symbol icon property.

Part Class Type	Symbol Definition	User Class Name	Occurrence Class Name	Symbol Icon
PipeComponentClass	#Plant::SymbolDefinition#	#Plant::UserClassName#	#Plant::OccClassName#	

Due to a current software limitation, the symbol icon property value does not get populated when the report is run. Hence, in the Index sheet you need to explicitly provide the symbol icon name for the partclass before the report is run. So when the report is run the Symbol icon property value is readily available.

11		
12	PartClassName	SymbolIconPath
13	ButterflyValve	SymbolIcons\SP3DButterflyValveSym.gif
14		
15		

📝 **NOTE**

▪ The PartClassName keyword needs to be in column A, and the SymbolIconPath keyword needs to be in the column B.

Step 5: Modify the SP3DReport_Definition Sheet

This sheet has xml documents embedded as comments. You must modify the embedded xml in cell A1 for the dimensional attributes. Add dimensional attributes as needed only in the places indicated by the **bold** text.

```
<?xml version="1.0" encoding="windows-1252"?>
<EXCEL_LAYOUT_DEFINITION xmlns="x-schema:ExcelLayout.xsd"
FillingMode="CopyDown" SheetName="Sheet1">
  <HEADER StartRow="1" EndRow="8" RepeatOnNew="No"/>
  <ITEMS>
    <ITEM Name="PartData" ParentItem="" ItemRowsSpacing="0"
ItemRowsSpreading="1" RecordsPerPage="0">
      <ATTRIBUTES>
        <ATTRIBUTE Name="IndustryCommodityCode" IsLocked="No"/>
        <ATTRIBUTE Name="CommodityType" IsLocked="No"/>
        <ATTRIBUTE Name="GeometryType" IsLocked="No"/>
        <ATTRIBUTE Name="GraphicalRepresentationOrNot" IsLocked="No"/>
        <ATTRIBUTE Name="SymbolDefinition" IsLocked="No"/>
        <ATTRIBUTE Name="MaterialGrade" IsLocked="No"/>
        <ATTRIBUTE Name="LiningMaterial" IsLocked="No"/>
        <ATTRIBUTE Name="BendRadius" IsLocked="No"/>
        <ATTRIBUTE Name="BendRadiusMultiplier" IsLocked="No"/>
        <ATTRIBUTE Name="MirrorBehaviorOption " IsLocked="No"/>
        <ATTRIBUTE Name="GeometricIndustryStandard" IsLocked="No"/>
        <ATTRIBUTE Name="PartDataBasis" IsLocked="No"/>
        <ATTRIBUTE Name="ValveManufacturer" IsLocked="No"/>
        <ATTRIBUTE Name="ValveModelNumber" IsLocked="No"/>
        <ATTRIBUTE Name="ValveTrim" IsLocked="No"/>
        <ATTRIBUTE Name="FlangeFaceSurfaceFinish" IsLocked="No"/>
        <ATTRIBUTE Name="SurfacePreparation" IsLocked="No"/>
        <ATTRIBUTE Name="ManufacturingMethod" IsLocked="No"/>
        <ATTRIBUTE Name="MiscRequisitionClassification" IsLocked="No"/>
        <ATTRIBUTE Name="PipingPointBasis1" IsLocked="No"/>
        <ATTRIBUTE Name="Id1" IsLocked="No"/>
        <ATTRIBUTE Name="PressureRating1" IsLocked="No"/>
        <ATTRIBUTE Name="EndPreparation1" IsLocked="No"/>
        <ATTRIBUTE Name="EndStandard1" IsLocked="No"/>
        <ATTRIBUTE Name="ScheduleThickness1" IsLocked="No"/>
        <ATTRIBUTE Name="FlowDirection1" IsLocked="No"/>
        <ATTRIBUTE Name="PipingPointBasis2" IsLocked="No"/>
        <ATTRIBUTE Name="Id2" IsLocked="No"/>
        <ATTRIBUTE Name="PressureRating2" IsLocked="No"/>
        <ATTRIBUTE Name="EndPreparation2" IsLocked="No"/>
        <ATTRIBUTE Name="EndStandard2" IsLocked="No"/>
        <ATTRIBUTE Name="ScheduleThickness2" IsLocked="No"/>
        <ATTRIBUTE Name="FlowDirection2" IsLocked="No"/>
        <ATTRIBUTE Name="PipingNote1" IsLocked="No"/>
        <ATTRIBUTE Name="DryWeight" IsLocked="No"/>
        <ATTRIBUTE Name="DryCogX" IsLocked="No"/>
        <ATTRIBUTE Name="DryCogY" IsLocked="No"/>
        <ATTRIBUTE Name="DryCogZ" IsLocked="No"/>
        <ATTRIBUTE Name="WaterWeight" IsLocked="No"/>
        <ATTRIBUTE Name="WaterCogX" IsLocked="No"/>
        <ATTRIBUTE Name="WaterCogY" IsLocked="No"/>
        <ATTRIBUTE Name="WaterCogZ" IsLocked="No"/>
        <ATTRIBUTE Name="SurfaceArea" IsLocked="No"/>
        <ATTRIBUTE Name="VolumetricCapacity" IsLocked="No"/>
        <ATTRIBUTE Name="Npd1" IsLocked="No"/>
```

```
        <ATTRIBUTE Name="NpdUnitType1" IsLocked="No"/>
        <ATTRIBUTE Name="Npd2" IsLocked="No"/>
        <ATTRIBUTE Name="NpdUnitType2" IsLocked="No"/>
        <ATTRIBUTE Name="FacetoFace" IsLocked="No"/>
     </ATTRIBUTES>
   <QUERY_PARAMETERS>
   <XREF_PARAMETER Name="PartClassName"/>
   </QUERY_PARAMETERS>
      <SORT/>


   <LABELS>
   <LABEL Reference="Piping Pipe Length_Local1" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B1" LocalFormatParamPath="C1">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="BendRadius"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_BendRadius" IsLocked="No"/>
   </LABEL>
   <LABEL Reference="Piping Pipe Length_Local2" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B2" LocalFormatParamPath="C2">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="DryCogX"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_DryCogX" IsLocked="No"/>
   </LABEL>
   <LABEL Reference="Piping Pipe Length_Local3" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B3" LocalFormatParamPath="C3">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="DryCogY"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_DryCogY" IsLocked="No"/>
   </LABEL>
   <LABEL Reference="Piping Pipe Length_Local4" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B4" LocalFormatParamPath="C4">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="DryCogZ"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_DryCogZ" IsLocked="No"/>
   </LABEL>
   <LABEL Reference="Piping Pipe Length_Local5" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B5" LocalFormatParamPath="C5">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="WaterCogX"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_WaterCogX" IsLocked="No"/>
   </LABEL>
   <LABEL Reference="Piping Pipe Length_Local6" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B6" LocalFormatParamPath="C6">
   <INPUT_ATTRIBUTES>
   <XREF_ATTRIBUTE Name="WaterCogY"/>
   </INPUT_ATTRIBUTES>
   <OUTPUT_ATTRIBUTE Name="lbl_WaterCogY" IsLocked="No"/>
   </LABEL>
```

```
    <LABEL Reference="Piping Pipe Length_Local7" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B7" LocalFormatParamPath="C7">
    <INPUT_ATTRIBUTES>
    <XREF_ATTRIBUTE Name="WaterCogZ"/>
    </INPUT_ATTRIBUTES>
    <OUTPUT_ATTRIBUTE Name="lbl_WaterCogZ" IsLocked="No"/>
    </LABEL>
    <LABEL Reference="Piping Pipe Length_Local8" Trigger="AfterQuery"
LocalLabel="Yes" LocalFormatPath="B8" LocalFormatParamPath="C8">
    <INPUT_ATTRIBUTES>
    <XREF_ATTRIBUTE Name="FacetoFace"/>
    </INPUT_ATTRIBUTES>
    <OUTPUT_ATTRIBUTE Name="lbl_FacetoFace" IsLocked="No"/>
    </LABEL>
    <LABEL Reference="Structure Member Weight_Local9"
Trigger="AfterQuery" LocalLabel="Yes" LocalFormatPath="B9"
LocalFormatParamPath="C9">
    <INPUT_ATTRIBUTES>
    <XREF_ATTRIBUTE Name="DryWeight"/>
    </INPUT_ATTRIBUTES>
    <OUTPUT_ATTRIBUTE Name="lbl_DryWeight" IsLocked="No"/>
    </LABEL>
    <LABEL Reference="Structure Member Weight_Local10"
Trigger="AfterQuery" LocalLabel="Yes" LocalFormatPath="B10"
LocalFormatParamPath="C10">
    <INPUT_ATTRIBUTES>
    <XREF_ATTRIBUTE Name="WaterWeight"/>
    </INPUT_ATTRIBUTES>
    <OUTPUT_ATTRIBUTE Name="lbl_WaterWeight" IsLocked="No"/>
    </LABEL>
 </LABELS>
 </ITEM>
 <ITEM Name="Plant" ParentItem="" ItemRowsSpacing="0"
ItemRowsSpreading="1" RecordsPerPage="0">
 <ATTRIBUTES>
 <ATTRIBUTE Name="UserClassName" IsLocked="No"/>
 <ATTRIBUTE Name="OccClassName" IsLocked="No"/>
 <ATTRIBUTE Name="SymbolDefinition" IsLocked="No"/>
 </ATTRIBUTES>
 <QUERY_PARAMETERS>
 <XREF_PARAMETER Name="PartClassName"/>
 </QUERY_PARAMETERS>
 </ITEM>
 </ITEMS>
 <UOM_PARAMETERS>
 <XREF_PARAMETER Name="Length"/>
 <XREF_PARAMETER Name="Weight"/>
 </UOM_PARAMETERS>
 <MATRIX_PARAMETERS/>
 </EXCEL_LAYOUT_DEFINITION>
```

In column B, there is an embedded xml in cell B8. This xml corresponds to the FacetoFace attribute. If you need to add new attributes, copy this xml into the new attributes comment cell and edit the indicated areas.

```
<?xml version="1.0" encoding="UTF-8"?>
<REPORT_FORMATTING Name="Piping Pipe Length" Description="Length">
<DESIGN_TIME Progid="SP3DLabelFormatDesigner.RTFLabel" Action=""
Arg=""/>
<RUN_TIME Progid="SP3DLabelsFormat.FormatLabel" Action="RTFLabel"
Arg=""/>
<FORMATTING_PARAMETERS Name="Piping Pipe Length" Site="User"
Path="Piping Pipe Length_Local8.rfp"/>
<LAYOUT_TEMPLATE Type="Internal"/>
<RTF_LABEL>
<POINTS/>
<VECTORS/>
<BLOCKS>
<BLOCK Action="Visible">
<TOKENS>
<PHYSICAL Column="FacetoFace" UOM="Length" Visible="yes"/>
</TOKENS>
</BLOCK>
</BLOCKS>
</RTF_LABEL>
</REPORT_FORMATTING>
```

Step 6: Test

Save and exit all the files that you have edited and using the **Tools > Run Reports** command, run the Engineering Check Report for your part class to test for problems.

Interfaces and Categories

Before you can work with interfaces and categories, you need to know what they are. An interface is a collection of properties. For example, the IJInsulationThickness interface contains several properties that describe insulation. Interfaces are software grouping mechanisms and are not visible to the software user. A property is a unique characteristic of an object that can include both data information and display information. A category is a collection of interface properties, which is visible to the software user.

You can create new interfaces and properties and add them to new or existing part classes that you define for the catalog. You can also modify existing interfaces and properties, such as changing the display name of a property.

The **Catalog** task only displays user-defined interfaces and does not expose system interfaces and properties for modification. As a result, some properties that appear on the property dialog box for selected model objects will not be available to you for modification.

The Schema Browser is very useful to help you find which interfaces contain particular properties that you are interested in modifying. This utility is delivered with the *Programming Resources Installation* setup. After you install and run this program, use the **Find** command to locate the display name of the property that you want to modify. For more information, see *Using the Schema Browser* (on page 121).

There are no software restrictions to prevent you from modifying interfaces and categories in a live catalog; however, we do not recommend this as you may be editing something that another user is accessing simultaneously. Ideally, all catalog changes should be made at the beginning of a project before modeling begins. Because this is not always possible, we recommend that you create a "live" and a "test" catalog database. You should make all changes in the test catalog and verify the changes in a test model. After the changes are verified, an administrator should select a convenient time to have all users stop modeling, create a backup, and then use copy and paste to move the changes from the test catalog to the live catalog.

What do you want to do?

- *Change Property Display Name* (on page 117)
- *Create a Category* (on page 117)
- *Create an Interface* (on page 118)
- *Create a Property in an Interface* (on page 118)
- *Delete a Category* (on page 119)
- *Delete an Interface* (on page 119)
- *Delete a Property from an Interface* (on page 120)
- *Hide a Property* (on page 120)
- *Using the Schema Browser* (on page 121)
- *Change Property Type* (on page 122)

- *Change Property Units* (on page 122)
- *Make a Property Read-only* (on page 122)
- *Make a Property Editable* (on page 123)
- *Make a Property Value Required* (on page 123)

Change Property Display Name

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to rename.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to rename in the grid view.

5. In the **User Name** column, specify the new name.

6. Click **Save**.

Create a Category

1. Click **Grid View** on the ribbon.

2. In the tree view, expand the **Select Lists > Property Categories** node.

3. In the blank row at the bottom of the grid view, enter the short description, long description, and select list number of your new category.

4. To add another category, click **Insert Row**.

NOTES

- The software automatically saves the data that you enter when you select another row, select another node in the tree view, or select another command.

- If you select another row before entering all the required data, the software displays a message about the missing data.

Create an Interface

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Click **Insert Row** .

4. Enter a name for the new interface. Interface names must start with "IJ" and be 23 characters or shorter. Spaces are not allowed in interface names.

    ⚠ **CAUTION** You cannot change the interface name after it has been created. Use care when selecting a name and when typing.

5. Type the same name again in the **User Name** column.

6. Select a property category for the interface.

    💡 **TIP** For more information about creating a category, see *Create a Category* (on page 117).

7. Click **Save** to save your new interface.

📝 **NOTES**

- Use **Tab**, **Shift+Tab**, and the arrow keys to move between cells in the grid view.

- The software automatically saves the data that you enter when you select another row, select another node in the tree view, or select another command. Because you cannot change the interface name after it has been created, use care when clicking and typing in a new row.

- If you select another row before entering all the required data, the software displays a message about the missing data.

Create a Property in an Interface

1. Create the interface if you have not already done so.

    Create an Interface (on page 118)

2. Click **Grid View** on the ribbon.

3. In the tree view, expand **Interfaces and Categories > Interfaces**.

4. In the tree view, select the interface to which to add the property.

5. Click **Insert Row** .

6. In the **Name** column, enter a name for the property.

7. In the **User Name** column, enter the property name to display in the property dialog boxes. This is the name the software user will see.

8. In the **Type** column, specify the type of property.

9. In the **Units Type** column, enter the units system.

10. In the **Primary Units** column, enter the units system.

11. In the **Select List Name** column, specify the select list, if applicable.

12. In the **ProgID** column, enter the ProgID of Visual Basic function to validate the property.

13. In the **Select List Table Namespace** column, specify the table namespace to which the select list belongs.

14. In the **ProgID** column, enter the ProgID of Visual Basic function to validate the property.

15. In the **On Property Page** column, select whether the property that you are adding should appear in the property dialog boxes.

16. In the **Is Value Required** column, select whether or not the property is a required property.

17. In the **Read-Only** column, specify whether or not the software user can edit this property.

18. In the **Description** column, type a short description of the property for your use.

19. Click **Save** 💾 to save your new property.

📋 **NOTES**

▪ Use **Tab**, **Shift+Tab**, and the arrow keys to move between cells in the grid view.

▪ If you select another row before entering all the required data, the software displays a message about the missing data.

Delete a Category

1. Click **Grid View** 🏢 on the ribbon.

2. In the tree view, expand **Select Lists > Property Categories**.

3. Select the category to delete.

4. Click **Delete** ✕.

📋 **NOTE** You cannot delete system-defined categories.

Delete an Interface

1. Click **Grid View** 🏢 on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface to delete.

4. Click **Delete** ✕.

📋 **NOTES**

▪ You cannot delete system-defined interfaces.

▪ Deleting an interface removes that interface from all part classes that implement the interface.

Delete a Property from an Interface

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface from which to delete the property.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to delete. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to delete in the grid view.

5. Click **Delete** ✕.

NOTES

- To hide the property from users without deleting it, set the value in the **On Property Page** column to **False**.

- You cannot delete system-defined properties.

- Deleting a property will remove that property from all part classes that implement the property's interface.

Hide a Property

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to hide.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to hide. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to hide in the grid view.

5. Set the **On Property Page** column to **False**.

6. Click **Save** to save your change.

Using the Schema Browser

The 3D Schema Browser allows you to view the metadata and the relationships in the software. The browser also allows you to perform SQL-based queries and generate reports on the metadata.

Installing the 3D Schema Browser

1. Insert the product DVD.

2. Click **Full Installation**.

3. Read the license agreement. Click to agree to the Software License Agreement, and then click **Next**.

4. Enter your name or organization information.

5. Select the **Programming Resources Installation** option.

6. Follow the installation prompts to install the programming resources.

Using the 3D Schema Browser

1. On your computer, navigate to *[Product Folder]*\3D\Programming\Tools\Bin.

2. Double-click MetaDataBrowser.exe. You may want to create a short-cut on your desktop to this file.

3. Click **File > Open Database**.

4. Select your database provider, database server, and the catalog schema database.

5. Click **Edit > Find**.

6. Type the name of the property that you want to find its interface name. For example, if I'm trying to find the interface name that contains the "Vessel Height" property, type *Vessel Height*.

7. In the **Look at** box, select **UserName** under **Attribute**.

8. Click **Find Next**.

9. In the tree view, look for the interface name indicated by the icon. Write this name down.

10. Go to the **Catalog** task.

11. Under the **Interfaces and Categories\Interfaces** node, find the interface name from the 3D Schema Browser.

Change Property Type

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to edit.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to edit the type of in the grid view.

5. In the **Type** column, specify the new property type.

6. Click **Save**.

Change Property Units

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to edit.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to edit the units for in the grid view.

5. In the **Unit Type** column, specify the new units type.

6. In the **Primary Units** column, specify the new primary units.

7. Click **Save**.

Make a Property Read-only

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to make read-only.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to make read-only in the grid view.

5. In the **Read Only** column, select **True**.

6. Click **Save**.

Make a Property Editable

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to make editable.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to make editable in the grid view.

5. In the **Read Only** column, select **False**.

6. Click **Save** .

Make a Property Value Required

1. Click **Grid View** on the ribbon.

2. In the tree view, expand **Interfaces and Categories > Interfaces**.

3. Select the interface that contains the property to make a required property.

   TIP Use the Schema Browser to help you locate the interface that contains the property that you want to rename. The Schema Browser is available in the programmer's resources setup. For more information, see *Using the Schema Browser* (on page 121).

4. Select the property to make required in the grid view.

5. In the **Is Value Required** column, select **True**.

6. Click **Save** .

SECTION 5
Select Lists

A select list is a set of predefined acceptable values for a particular attribute. For example, the **Fluid Code** select list defines all the acceptable fluid names that you can use; consequently, you can only select fluids that are defined in the **Fluid Code** select list.

💡 **TIP** Select lists are also called Codelists, Pick Lists, or Enumerated Lists. For example, in the Excel workbooks delivered with the software, a select list is referred to as a codelist.

Generally, each entry in a select list has a unique number to identify that value, a short description, and a long description. Short and long descriptions are limited to 255 characters. Depending on where the software is using the select list, you can select the short description to select the select list item.

The delivered select lists can be categorized into these types: system, simple, and hierarchical. System select lists contain values that users must not change. Simple select lists map numbers with descriptions. Hierarchical select lists contain groups of mappings. For example, Construction Type is a hierarchical select list. As shown in the following illustration, the top-level select list has four values: **Undefined**, **New**, **Existing**, and **Future**.

ConstructionRequirement Short Description	ConstructionRequirement Long Description	ConstructionRequirement Codelist Number	ConstructionType Short Description	ConstructionType
New		2	New	
Existing		3	Revamp	
			Temporary	
			Dismantle	
			Existing	
			Existing, to be modified	
			Existing, to be reused in place	
			Existing, to be modified and relocated	
			Existing, to be relocated and reused	
			Existing, not to be revamped	
			Recalibrate	
Future		8	Future	
			Proposed	
Undefined		1	Undefined	

Depending on which value you select, different construction type options are available. For example, if you select **Future**, two construction type options are available: **Future** and **Proposed**.

You can use the **Catalog** task to modify select lists to reflect your own practices, terminology, and language. Additionally, you can define the display order for select list values. This order is stored in the Catalog database and determines how select list values are displayed in the 3D modeling environment.

Some limitations apply to the modification of a delivered select list. You cannot delete a select list after it is loaded into the Catalog database, and the name for each select list must be unique in the database.

You can edit the lowest level in a hierarchical select list, but you must not edit any higher levels in the select list. You can edit simple select lists (without a hierarchy) unless otherwise specified. Specific information regarding each select list available in the **Catalog** task is provided in Appendix: Select Lists.

⭐ **IMPORTANT** Although revisions that you make to a select list within the **Catalog** task are instantly added to the Catalog database, the current release of the software does not provide a means for exporting select list data out of the database and into the **AllCodelists.xls** workbook delivered with the software. Consequently, if you intend to use the Bulkload Utility in tangent

with the select list editing capabilities in the **Catalog** task, Intergraph recommends that you implement a workflow that keeps the data in the Excel workbooks synchronized with the changes made in the **Select Lists** node in the **Catalog** task. For example, if you use the **Catalog** task to modify one of the short code descriptions in the **NutOption** select list, you must also update the **NutOption** worksheet in the **AllCodelists.xls** workbook. For more information about the Excel workbooks delivered with the software, see the *Reference Data Guide*, available from the **Help > Printable Guides** command in the software.

What do you want to do?

- *Create a New Select List* (on page)
- *Edit a Select List* (on page)
- *Add a Select List Value* (on page)
- *Define the Display Order of a Select List* (on page)

Create a New Select List

1. In the Catalog hierarchy, navigate to the **Select Lists** node.

2. Click **Catalog > New > Item**.

3. In the **New Select List** dialog box, type a name for the new select list.

4. If the new select list is dependent on another select list, select the name from the **Dependent select list name** list.

   TIP If no dependency exists, you can leave the **Dependent select list name**.

5. Click **OK**.

NOTE You cannot delete a select list after it has been added to the Catalog database.

Edit a Select List

1. In the Catalog hierarchy, open the **Select Lists** node.

2. Navigate through the **Select Lists** node and click the appropriate select list.

3. In the grid on the left side of the window, modify the long description or the short description of the select list.

   CAUTION You can edit the lowest level in a hierarchical select list, but you must not edit any higher levels in the select list.

4. Press **Enter** to store the changes to the Catalog database.

NOTES

- You can use **Move Up** and **Move Down** to define the display order for select list values. This order is stored in the database and used to present values in the 3D modeling environment.

- Specific information regarding each select list available in the **Catalog** task is provided in Appendix: Select Lists.

Add a Select List Value

1. In the Catalog hierarchy, open the **Select Lists** node.

2. Navigate through the **Select Lists** node and click the appropriate select list.

3. In the Content view on the left side of the window, scroll down to the last row in the grid.

TIPS

- In a hierarchical select list, a blank row exists for each child select list, as shown in the following illustration:

- You can click **Insert Row** ⬚ to add the new select list value anywhere within context of the grid.

4. Enter a long description, a short description, and a number for the select list entry.

5. Press **Enter** to add the select list entry to the Catalog database.

NOTES

- Short descriptions for all select list values must be unique within a select list.

- The new select list value is automatically added to the Catalog database.

- You can use **Move Up** ⬆ and **Move Down** ⬇ to define the display order for select list values. This order is stored in the database and used to present values in the 3D modeling environment.

- Specific information regarding each select list available in the **Catalog** task is provided in Appendix: Select Lists.

Define the Display Order of a Select List

1. In the Catalog hierarchy, open the **Select Lists** node.

2. Navigate through the **Select Lists** node and select the appropriate select list.

3. Select a select list entry in the editable grid.

4. Click **Move Up** . The selected row moves up one line. The new sort order is saved and the row remains selected. To move the selected row down one line, click **Move Down** .

5. Continue using **Move Up** and **Move Down** to define the sort order for all entries in the select list.

NOTE The **Move Up** and **Move Down** commands are also available on the **Edit** menu.

Piping Reference Data

After the initial Catalog database is created, you can use the **Catalog** task to define additional piping specifications and part data interactively in the **Catalog** task instead of defining your piping reference data in workbooks and then bulkloading the workbooks to the Catalog database.

If you have Intergraph's materials management software SmartPlant Materials, you can create piping specifications in SmartPlant Materials (Powered by MARIAN®), export them to Microsoft Excel workbooks, and then bulkload them into your catalog. Refer to your SmartPlant Materials documentation for more information.

Understanding how the piping reference data works is essential to effective use of the software. For example, when you route pipe, nearly everything you see on a **Properties** dialog box comes from reference data. While you route pipe, you are also constrained by piping specification rules in reference data. In addition, you need to read and understand the concepts and procedures about select lists. For more information, see *Select Lists* (on page 124).

Piping Workbooks

The piping reference data is defined in multiple Microsoft Excel workbooks so that you can bulkload only what you need. The software delivers these workbooks to the *[Product Folder]*\CatalogData\Bulkload\Datafiles and to the *[Product Folder]*\CatalogData\Bulkload\SampleDataFiles folders. The complete list of available piping specifications is in Appendix: Delivered Pipe Specifications.

The following piping reference data workbooks are delivered in *[Product Folder]*\CatalogData\Bulkload\Datafiles folder:

Piping Specification.xls
Piping Catalog.xls
Piping Specialty Data.xls
Piping.xls
Instrument Data.xls
On-the-fly Instruments.xls
On-the-fly Piping Specialties.xls
Ten_Specs_CatalogData.xls
Ten_Specs_SpecificationData.xls

The following piping reference data workbooks are delivered in *[Product Folder]*\CatalogData\Bulkload\SampleDataFiles folder:

1S6470 Catalog.xls
1S6470 Specification.xls
4C0844 Catalog.xls
4C0844 Specification.xls
9L3760 Catalog.xls
9L3760 Specification.xls
Additional data for ASME B16.47 Flanges Catalog.xls
Additional data for ASME B16.47 Flanges Specification.xls
Automated Selection of Parts at Spec Break Rules.xls

Bio Pharm Catalog.xls
Bio Pharm Specification Catalog.xls
Bolt Commodity Code Substitution.xls
Bolt Diameter Equivalence.xls
BoltSelection Filter for Nozzles Sample data.xls
Clamp-on Flow Sensor Sample Data.xls
ComponentInsulationExclusion.xls
Connection Parts Commodity Code Substitution.xls
Field Lining Thickness.xls
Flange Insulation Kits Sample Data.xls
Flared Piping Catalog.xls
Flared Piping Specification.xls
FlexibleHoseAssemblyRuleData.xls
FlexibleHoseCodelists.xls
GasketSelection Filter for Nozzles Sample Data.xls
Instrument Sample Data.xls
Jacketed Piping Catalog.xls
Jacketed Piping Specification.xls
Non Radial Branches.xls
Pipe Bending Manufacturability Rules.xls
Pipe Sleeve with Puddle Flange Sample Data.xls
Piping Commodity Procurement Data.xls
Piping Specialty Sample Data.xls
Reportable Commodities for Filters.xls
Sample Codelist for Surface Mounted Components using PCF.xls
Sample Codelists.xls
Sample Data Flange Face Adapter.xls
Sample Data for 45 Degree Angle Valve.xls
Sample Data for Angle Lift Check Valve.xls
Sample Data for BoltLengthLookupRule.xls
Sample Data for Butterfly Valve.xls
Sample Data for Check Valve with External Spring Operator.xls
Sample Data for Concentric Reducer Biological-pharmaceutical.xls
Sample Data for Coupling.xls
Sample Data for Deck Scupper.xls
Sample Data for Detailed Valves.xls
Sample Data for Double Basket Strainers.xls
Sample Data for Dresser Coupling.xls
Sample Data for Drilling Templates of Flanges.xls
Sample Data for Elbows.xls
Sample Data For End Preparation Compatibility Exceptions Rule.xls
Sample Data for Exhaust Heads.xls
Sample Data for Expansion Joints.xls
Sample Data for Filters.xls
Sample Data for Fire and Safety Symbols.xls
Sample Data for Fitting Reducer.xls
Sample Data for Fittings.xls
Sample Data for Flame Arresters.xls
Sample Data for Flanged Elbow-Pipet.xls
Sample Data for Flanged Olet.xls
Sample Data for Flex Coupling.xls
Sample Data for Foam Chamber.xls
Sample Data for GooseNeck Bull Plug.xls

Sample Data for Half Coupling.xls
Sample Data for Hose Connection.xls
Sample Data for Hose Couplings.xls
Sample Data for Hydraulic Flanges.xls
Sample Data for Jacketed Piping Symbols.xls
Sample Data for JIS Fittings.xls
Sample Data for Lap Joint Flanges.xls
Sample Data for Latrolet.xls
Sample Data for Long Sweep Tees.xls
Sample Data for Long Tangent Elbows.xls
Sample Data for Mining Symbols.xls
Sample Data for Mitered Elbows.xls
Sample Data for NPDCompatibilityExepRule.xls
Sample Data for On-the-fly Instruments.xls
Sample Data for On-the-fly Specialties.xls
Sample Data for Open and Blind Spacer set.xls
Sample Data for Orifice Flanges with Multi Taps.xls
Sample Data for Orifice Flanges with Two Taps.xls
Sample Data for Rupture Disc with Holder.xls
Sample Data For Reinforced Branches using Implied Pipe Stock.xls
Sample Data for Saddles.xls
Sample Data for Sight Flow Indicators.xls
Sample Data for Silencers.xls
Sample Data for Siphons.xls
Sample Data for Spectacle Blind.xls
Sample Data for Steam Traps.xls
Sample Data for Strainers.xls
Sample Data for Street Elbows.xls
Sample Data for Surface Mounted Components using PCF.xls
Sample Data for Surface Mounted Components.xls
Sample Data for Surface Mounted Doubler Plate.xls
Sample Data for Surface Mounted Insert Plate.xls
Sample Data for Surface Mounted Pipe Sleeve With Seal.xls
Sample Data for Surface Mounted Pipe Sleeve.xls
Sample Data for Tapered Spacers.xls
Sample Data for Tee with asymmetric branch.xls
Sample Data for Trimmable Olets.xls
Sample Data for Trimmable Reducing Tee.xls
Sample Data for True Wye.xls
Sample Data for Underground and Sanitary Symbols.xls
Sample Data for Vacuum Piping.xls
Sample Data for Valve Operators.xls
Sample Data for Valves.xls
Sample Data for Versionable Pipe Specs.xls
Sample Data for Weaker RPad Selecion.xls
Sample Data for Zero Radius Elbow.xls
Sample Data Piping Specification.xls
Sample data Reportable Piping Commodity Basis Reducing Fittings.xls
Sample End Generic Data for Socket Welded Fittings based on Socket Wall Thickness.xls
Socket Offset Rule.xls
Standard Nozzle Data.xls
Union Fitting Assembly Data.xls
Victaulic Catalog.xls

Victaulic Codelists.xls
Victaulic Plant Rules.xls
Victaulic Spec A4.xls
Victaulic Spec A11.xls

Because bulkloading all of these specifications would create a very large catalog, a subset of ten specifications is used to create the CatalogDB.datfile that is delivered with the software. This subset of ten specifications is delivered in the **Ten_Specs_SpecificationData.xls** and **Ten_Specs_CatalogData.xls** workbooks and is listed below.

Specification Name	Materials Description	Fluid Service
1C0031	CL150 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process
1S3977	CL150 RFFE, 304/CS Valves, Trim 8	Lube and seal oil
1S3984	CL150 RFFE, 304/316 Valves, Trim 12	Process
2C0032	CL300 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process
2L1670	CL300 RFFE, 1.25Cr-0.5Mo, 316 Trim, MJ, other	Catalyst lift lines
2S3985	CL300 RFFE, 304/316 Valves, Trim 12	Process
4C0033	CL600 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process
5C0390	CL900 BE/RFFE, CS, Trim 5, (ASME-I)	Low pressure CL150 steam
6C0391	CL1500 BE/RJFE, CS, Trim 5, (ASME-I)	Low pressure CL150 steam
AC0014	CL125 FFFE, CS, Bronze Trim	Cooling water

The **Piping.xls** workbook contains four example pipe specifications (N0, N1, 1C0100, and 1C0101) that Intergraph uses for testing purposes. These four example pipe specifications are also available in the delivered Catalog template file.

Specification Name	Materials Description	Fluid Service
N0	CL150, Carbon Steel, RFFE, Trim 8, < 50mm SWE, >= 50mm BE	Piping Spec N0 Service
N1	CL300, Carbon Steel, RFFE, Trim 8, < 50mm SWE, >= 50mm BE	Piping Spec N1 Service

1C0100	CL150 RFFE, CS, PTFE Lined, Std Trim, Flanged Pipe and Fittings	ASME Class 150 Process
1C0101	CL150 RFFE, CS, PTFE Lined, Std Trim, Flanged Pipe and Fittings	ASME Class 150 Process

See Also

Piping Rules (on page 146)
Commodity Codes (on page 141)
Pipe Specifications (on page 136)

Defining Piping Reference Data

The definition of piping reference data can be broken down into five major efforts:

- Review and customize the Select Lists as needed. For more information, see *Select Lists* (on page 124).

- Define the generic dimensional data.

- Define model rules. These rules and settings affect all piping specifications.

- Define piping parts

- Define piping material class specifications

Define Generic Dimensional Data

1. Define the bolted end data. For step-by-step instructions, see *Define Bolted End Data* (on page 134).

2. Define the female end data. For step-by-step instructions, see *Define Female End Data* (on page 135).

3. Define the mechanical end data. For step-by-step instructions, see *Define Mechanical End Data* (on page 135).

4. Define the liner thickness data, if needed. For step-by-step instructions, see *Define Liner Thickness Data* (on page 135).

5. Define the DIN wall thickness data, if needed. For step-by-step instructions, see *Define DIN Wall Thickness Data* (on page 134).

Define Model Rules

1. Set the overall model options. For step-by-step instructions, see *Define Default Model Options* (on page 156).

2. Set the default change of direction settings. For step-by-step instructions, see *Define Default Change of Direction* (on page 155).

3. Set the default piping commodity selection settings. For step-by-step instructions, see *Define Default Piping Commodity Selection* (on page 156).

4. Set the end preparation compatibility settings. For step-by-step instructions, see *Define End Preparation Compatibility* (on page 156).

5. Set the nominal piping diameter equivalence rule settings. For step-by-step instructions, see *Define NPD Equivalence* (on page 163).

6. Set the bolt extension rule settings. For step-by-step instructions, see *Define Bolt Thread Extensions* (on page 152).

7. Set the preferred stud bolt length settings. For step-by-step instructions, see *Define Preferred Stud Bolt Length* (on page 167).

8. Set the preferred machine bolt length settings. For step-by-step instructions, see *Define Preferred Machine Bolt Length* (on page 167).

9. Set the preferred cap screw length settings. For step-by-step instructions, see *Define Preferred Cap Screws Length* (see "*Define Preferred Cap Screw Length*" on page 166).

10. Set the machine bolt length calculation tolerance settings. For step-by-step instructions, see *Define Machine Bolt Calculation Tolerance* (on page 160).

11. Set the stud bolt length calculation tolerance settings. For step-by-step instructions, see *Define Stud Bolt Calculation Tolerance* (on page 171).

12. Set the cap screw length calculation tolerance settings. For step-by-step instructions, see *Define Cap Screw Calculation Tolerance* (see "*Define Cap Screw Length Calculation Tolerance*" on page 154).

13. Set the weld model representation rule settings. For step-by-step instructions, see *Define Weld Model Representation* (on page 173).

14. Set the weld type rule settings. For step-by-step instructions, see *Define Weld Type* (on page 173).

15. Optionally, set the minimum pipe length rule settings. For step-by-step instructions, see *Define Minimum Pipe Length* (on page 161).

16. Optionally, set the minimum pipe length for purchase settings. For step-by-step instructions, see *Define Minimum Pipe Length Purchase* (on page 162).

17. Optionally, set the port alignment settings. For step-by-step instructions, see *Define Port Alignment* (on page 165).

18. Optionally, set the pipe bending elongation settings. For step-by-step instructions, see *Define Pipe Bending Elongation Information* (on page 164).

19. Optionally, set the flared pipe settings. For step-by-step instructions, see *Define Flared Pipe Information* (on page 158).

20. Optionally, set the fluid density settings. For step-by-step instructions, see *Define Fluid Density* (on page 159).

21. Optionally, set the slip-on flange setback distance settings. For step-by-step instructions, see *Define Slip on Flange Setback Distance* (on page 170).

22. Optionally, set the plate flange setback distance settings. For step-by-step instructions, see *Define Plate Flange Setback Distance* (on page 165).

23. Optionally, set the weld gap rule settings. For step-by-step instructions, see *Define Field Fit Length* (on page 158).

Define Piping Parts

To define piping part classes, see *Create New Piping Part Classes* (on page 212).

Define Piping Specifications (Material Classes)

To create your own piping specifications using copy and paste, see *Create a Piping Specification Using Copy and Paste* (on page 140).

To create your own piping specifications from scratch, see *Create a New Piping Specification* (on page 138).

What do you want to do?

- *Define Bolted End Data* (on page 134)
- *Define DIN Wall Thickness Data* (on page 134)
- *Define Female End Data* (on page 135)
- *Define Liner Thickness Data* (on page 135)
- *Define Mechanical End Data* (on page 135)
- *Define Plain Piping Data* (on page 135)

Define Bolted End Data

1. In the tree view, click **Piping > Generic Dimensional Data > Bolted End Data**.

2. Click **Grid View** on the ribbon.

3. Click **Insert Row** to insert a blank row in the grid view.

4. Define the bolt end data by providing appropriate values in the different columns.

NOTE For more information about each property that you can define, see *Bolted End Data* (on page 315).

Define DIN Wall Thickness Data

1. In the tree view, click **Piping > Generic Dimensional Data > DIN Wall Thickness Data**.

2. Click **Grid View** on the ribbon.

3. Click **Insert Row** to insert a blank row in the grid view.

4. Define the DIN wall thickness data by providing appropriate values in the different columns.

NOTE For more information about each property that you can define, see *DIN Wall Thickness Data* (on page 319).

Define Female End Data

1. In the tree view, click **Piping > Generic Dimensional Data > Female End Data**.

2. Click **Grid View** ⊞ on the ribbon.

3. Click **Insert Row** ⊒← to insert a blank row in the grid view.

4. Define the female end data by providing appropriate values in the different columns.

For more information about each property that you can define, see *Female End Data* (on page 320).

Define Liner Thickness Data

1. In the tree view, click **Piping > Generic Dimensional Data > Liner Thickness Data**.

2. Click **Grid View** ⊞ on the ribbon.

3. Click **Insert Row** ⊒← to insert a blank row in the grid view.

4. Define the liner thickness data by providing appropriate values in the different columns.

NOTE For more information about each property that you can define, see *Liner Thickness Data Sheet* (on page 322).

Define Mechanical End Data

1. In the tree view, click **Piping > Generic Dimensional Data > Mechanical End Data**.

2. Click **Grid View** ⊞ on the ribbon.

3. Click **Insert Row** ⊒← to insert a blank row in the grid view.

4. Define the mechanical end data by providing appropriate values in the different columns.

NOTE For more information about each property that you can define, see *Mechanical End Data* (on page 323).

Define Plain Piping Data

1. In the tree view, click **Piping > Generic Dimensional Data > Plain Piping Data**.

2. Click **Grid View** ⊞ on the ribbon.

3. Click **Insert Row** ⊒← to insert a blank row in the grid view.

4. Define the plain piping data by providing appropriate values in the different columns.

For more information about each property that you can define, see *Plain Piping Data* (on page 325).

Pipe Specifications

You can use the **Catalog** task to create and edit your piping specification reference data.

★ **IMPORTANT** Before introducing changes into a working project, we recommend that you create a separate Model and Catalog database specifically for testing your piping specifications and all other catalog changes. After creating, testing, and verifying your additions/changes in the test catalog, copy the additions/changes to the working project catalog.

When creating piping specifications, we recommend that you start with an existing specification, one that resembles the specification you need to create. For example, locate an existing specification that has similar materials, pressure ratings, end preparations, and fluid service codes and then copy and paste the existing specification to create your new piping specification, and then make the appropriate modifications.

Many companies prefer to keep a master specification, which provides a centralized starting point for all project specifications. The master specification contains all the commodity codes, and each project then copies from the master specification as a starting point.

The purpose of a project piping specification is to limit and aid in the selection of piping parts available to a piping designer as they design piping systems. Limiting the selection of parts eliminates decisions by the designer related to applicability, cost, procurement, and safety of particular parts within particular pipeline services. Rules regarding the usage of particular types of parts in particular design situations also limit part selection. Within a particular pipeline service, decisions relating to allowed parts and requirements for the parts that may be used in that service are made in advance by the specification author.

The piping specification is represented by piping materials classes, which define the requirements, characteristics, and behavior of the piping commodities for a specific service. Typically, the piping specification is specific to a project. The data required for the piping specification and the piping materials classes can be categorized as follows:

- The data that defines the piping specification is the piping specification data.

- The business rules that apply to the piping specification are the piping specification rules. For more information, see *Model Rules* (on page 146).

- The data that defines the piping materials class is the piping materials class data. For more information, see *Piping Materials Class Data* (on page 390).

- The business rules that manage the behavior of the piping commodities within this service are the piping materials class rules. For more information, see *Piping Materials Class Rules* (on page 174).

- The data that represents the rules for selecting piping commodities within the piping materials class is the piping commodity filter. For more information, see *Piping Commodity Filter* (on page 385).

- The standard notes that apply to a specific piping materials class or to an individual piping commodity, piping specialty, instrument, or connection commodity in the piping specification are the piping specification notes.

- The data that represents the rules for selecting gaskets, bolts, nuts, and washers at bolted joints and the rules for selecting clamps at mechanical joints within the piping materials class is the connection commodity filter. For more information, see one of the following:

    Bolt Selection Filter (on page 375)
    Clamp Selection Filter (on page 378)
    Gasket Selection Filter (on page 381)

- The data that is specific to the engineering office, and is used for the material control of piping commodities, is the piping commodity material control data. This data is a function of the contractor commodity code.

- The data that determines the Common Industry Material Identification Standards (CIMIS) size-dependent commodity code from the contractor's size-independent commodity code is the size-dependent commodity code data. This data is a function of the contractor commodity code (or the industry commodity code) and the sizes for each piping point.

  NOTE CIMIS is a cross-industry initiative to provide common identifiers and standard descriptions for commodity materials used in maintenance, operations, construction, and OEM activities.

- The data that is specific to the engineering office, and is used for the material control of valve operators, actuators, and appurtenances, is the valve operator material control data. This data is a function of the valve operator catalog part number. For more information, see *Valve Operator Material Control Data* (on page 501) and *Multiport Valve Operator Data* (on page 350).

- The piping specification data that is required for reporting loose material and provided by the vendor is the vendor-supplied loose material data. This data is a function of the contractor commodity code and optionally the size.

- The data that is specific to the engineering office, is specific to a class of piping specialties, and is used for the material control of those piping specialties, is the piping specialty class data. This data is a function of the piping specialty tag number, and a size range for generic piping specialties. For more information, see *Piping Specialty Class Data* (on page 427).

- The data that is specific to the engineering office, is specific to a class of instruments, and is used for the material control of those instruments, is the instrument class data. This data is a function of the instrument tag number and a size range for generic instruments. For more information, see *Instrument Class Data* (on page 342).

What do you want to do?

- *Create a New Piping Specification* (on page 138)
- *Create a Piping Specification Using Copy and Paste* (on page 140)

Create a New Piping Specification

Before you begin, define the settings, rules, and notes:

1. Review the human specification thoroughly so that you completely understand all the requirements. You may want to review the *Interpreting Human Piping Specifications Guide* available from the **Help > Printable Guides**.

2. Click **Tools > Options**, and then select the **General Catalog Units** tab.

   a. Review and change any unit readout and precision setting as needed. For more information, see *Piping Catalog Units Tab (Options Dialog Box)* (on page 973).

3. Select the **Piping Specification** tab. For more information about the settings on this tab, see *Piping Specifications Tab (Options Dialog Box)* (on page 974). On this tab:

   a. Set the default industry practice.

   b. We recommend that you use the tools for building and selecting commodity codes. Select whether you are using just contractor, just industry, or both contractor and industry commodity codes. Be sure to load the corresponding rules using the **Load** command on this tab. You can edit the values if needed after you load them. For step-by-step instructions, see *Define Commodity Code Rules* (on page 154).

   c. Select whether or not you want to create material descriptions by rule. If you choose to create material descriptions by rules, be sure to load the default material descriptions using the **Load** command. You can edit these rules after you load them. For step-by-step instructions, see *Define Material Description Rules* (on page 160).

   d. We recommend that you select the **Verify specification data on entry** option.

   e. Select how you want to determine the branch and headers sizes.

   f. Select how you want to display standard notes in the **Catalog** task.

4. Select the **Short Codes** tab. Add any missing short codes that you need. Set the selection basis that the software is to use. Click **OK** to initialize the short codes even if you do not add or edit the existing short codes. For more information about this tab, see *Short Codes Tab (Options Dialog Box)* (on page 976).

5. Define the standard piping notes that you need for the new piping specification. For step-by-step instructions, see *Define Standard Notes* (on page 171).

Create the piping material class data:

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. Click **Grid View** in the ribbon.

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Spec Name** column, type a name for the new piping specification, and then click **Save**.

5. Define the other properties of the new piping specification. For more information about each column, see *Piping Materials Classes* (on page 367).

Define the rules for the piping specification:

1. Open the new piping material class node in the tree view, and then open the **Piping Materials Class Rules** node.

2. Select the **Permissible Nominal Piping Diameters Rule** and define the nominal piping diameters to allow in your piping specification. The data you enter generates entries for the branch table. For step-by-step instructions, see *Define Allowable Nominal Piping Diameters* (on page 192).

3. Select the **Branch Table** rule and define the short codes in the branch table. For step- by-step instructions, see *Define Branch Selection Criteria* (on page 178).

4. Select the **Service Limits** rule and define the temperature and pressure service limits. By entering service limit values for a piping materials class, the software will force users who route pipe to enter temperature and pressure information for the pipe run. Only by forcing users to enter temperature and pressure information can the software comply with the service limits that you define. For step-by-step instructions, see *Define Service Limits* (on page 195).

5. Select the **Thickness Data Rule** and define the data needed for the wall thickness calculations. For step-by-step instructions, see *Define Thickness Data* (on page 198).

6. Select the **Corrosion Allowance** rule and define the data needed for the wall thickness calculations. For step-by-step instructions, see *Define Corrosion Allowances* (on page 179).

7. Select the **Joint Quality Factor** rule and define the needed data to use in wall thickness and branch reinforcement calculations. For step-by-step instructions, see *Define Joint Quality Factors* (on page 185).

8. Select the **Permissible Taps** rule and define the allowed taps. For step-by-step instructions, see *Define Permissible Taps* (on page 192).

9. Select the **Pipe Takedown Parts Rule** and define the takedown parts. For step-by- step instructions, see *Define Takedown Parts* (on page 197).

10. Open the **Piping Commodity Filter** node for the new piping specification, and click **Insert Row** .

11. Define the data required to select the piping commodities. If the short code you need does not appear in the **Short Code** list, you can create a new short code with the **Short Code** tab on the **Options** dialog box. For more information, see *Add a Short Code Value* (on page 57). For more information about each piping commodity filter property that you can define, refer to *Piping Commodity Filter* (on page 385).

12. Define other piping material class specific rules as required.

13. Click **Tools > Check Data** to verify the relationships between the data you enter into the editable grid against other data in the Catalog database. For step-by-step instructions, see *Checking Catalog Data* (on page 210). Make sure that you resolve all the problems.

Define the selection filters:

1. Define the data in the gasket selection filter. For step-by-step instructions, see *Define Gasket Selection Filters* (on page 184).

2. Click **Tools > Check Data** to verify the gasket data that you entered. For step-by-step instructions, see *Checking Catalog Data* (on page 210). Make sure that you resolve all the problems.

3. Define the data in the bolt selection filter. For step-by-step instructions, see *Define Bolt Selection Filters* (on page 177).

4. Click **Tools > Check Data** to verify the bolt data that you entered. For step-by-step instructions, see *Checking Catalog Data* (on page 210). Make sure that you resolve all the problems.

5. Define the data in the nut selection filter. For step-by-step instructions, see *Define Nut Selection Filters* (on page 191).

6. Click **Tools > Check Data** to verify the nut data that you entered. For step-by-step instructions, see *Checking Catalog Data* (on page 210). Make sure that you resolve all the problems.

7. Define the data in the washer selection filter. For step-by-step instructions, see *Define Washer Selection Filters* (on page 198).

8. Click **Tools > Check Data** to verify the washer data that you entered. For step-by-step instructions, see *Checking Catalog Data* (on page 210). Make sure that you resolve all the problems.

Verify the piping material specification:

1. Click **Tools > Verify Consistency Report** to check for errors. For more information about verifying consistency between piping specification and catalog data, see *Verifying Consistency Between Piping Specifications and Catalog Data* (on page 208).

Create a Piping Specification Using Copy and Paste

1. In the Catalog tree view, **Piping > Piping Specification > Piping Materials Classes**.

2. Select a piping specification and click **Copy** .

3. Click **Paste** .

4. In the **Paste** dialog box, type a name for the piping specification in the **New name** box, and then click **OK**. The specification and all of its rules are copied automatically and pasted. The new pipe specification appears as a node under the **Piping Materials Classes** branch.

5. Modify the name and other specification properties in the grid view, as needed. Data is saved automatically when you change to another row, click another node in the tree view, or select another command.

NOTES

- When working with piping specification reference data, try to start with an existing specification that resembles the one you need to create. For example, you can search for an existing specification that has similar materials, pressure ratings, and preparations, and fluid service codes. Once you locate the specification, copy the existing specification into your project and make the appropriate modifications.

- Many companies prefer to keep a master specification, which provides a centralized starting point for all project specifications. This master spec contains all the commodity codes, and each project that copies from the master spec as a starting point. Intergraph PPM recommends that you create a separate model specifically for testing specs before introducing changes into a working project.

Commodity Codes

The software uses commodity codes to select a unique piping part from the part catalog. The two types of commodity codes are contractor commodity code and industry commodity code.

- The contractor commodity code is determined from the piping commodity filter of the Piping Specification on the basis of the piping materials class, the short code, and the size. The contractor commodity code can reflect variations in size or schedule, or the contractor commodity code can be independent of both size and schedule.

- The industry commodity code is independent of both size and schedule and is derived from the piping commodity material control data on the basis of the contractor commodity code. If the contractor commodity code reflects variations in size or schedule, it is possible to have many contractor commodity codes correlated with one industry commodity code.

The catalog data is determined from the piping commodity class data and the piping commodity part data of the Piping Catalog on the basis of the commodity code and optionally the schedule or the size. The piping specification writer can use either the contractor commodity code or an industry commodity code as the commodity code basis for the Piping Catalog. You can set which commodity code is used using the *Model Options* (on page 434) node.

Use of the contractor commodity code has the advantage of not requiring a correlation with an industry commodity code. However, use of the industry commodity code provides the ability for the client to use different contractors, yet only correlate the commodity code system of the client once.

Select Commodity Code Dialog Box **(on page 141)**

See Also
Piping Materials Class Data (on page 390)

Select Commodity Code Dialog Box

Used to create contractor and industry commodity codes interactively by selecting the part properties.

To make this dialog box available, you must go to **Tools > Options**, select the **Piping Specifications** tab, and then set **Provide tools for building and selecting code for** to one of the enabled options. You also must define the default rules in **Piping > Piping Specification > Model Rules > Commodity Code Rules** (in the catalog hierarchy). You can load default rules to use as a starting point using the **Available rules** and **Load** options on the **Piping Specifications** tab of the **Options** dialog box.

After all the rules are defined and you have enabled the option, anywhere you are required to enter a commodity code in the grid view, select **Select Commodity Code...** from the drop-down list to activate this dialog box.

Commodity type

Select the commodity type for which to build the commodity code. You must select something from this list first.

Method

Select how you want to build the code. You must start with the **Build code from part properties** method and select at least one property before you can use the **Choose code from available parts** method. After that, you can alternate between the two methods as needed.

▪ **Build code from part properties** - Builds the commodity code by the properties that you select in the **Part properties** list.

▪ **Choose code from available parts** - Displays a list of available parts based on what you have selected in the **Part properties** list using the **Build code from part properties** method.

Part properties

Displays the commodity type properties that you use to define the commodity code. By selecting a value for a property, the software adds that value's code to the commodity code. You can change what displays here by editing the default rules in **Piping > Piping Specification > Model Rules > Commodity Code Rules** (in the catalog hierarchy).

Commodity codes

Displays all available commodity code that you can select from based on what you have selected so far in the **Part properties** list. This field only displays when **Method** is set to **Choose code from available parts**.

Commodity code

Displays the commodity code as you build it. This option is read-only.

Material description

Displays the material description as you select part properties. This option is read-only. You must select the **Create material description by rule** option on the **Piping Specifications** tab of the **Options** dialog box to have the software create the material description. Otherwise, this option remains blank.

Add Range to Branch Table Command

The **Tools** > **Add Range to Branch Table** command adds a new node under the **Branch Table**, **Reinforcing Weld Data**, and **Reinforcing Pad Data** nodes in the **Catalog** tree view. These tables consist of multiple angle ranges. Additionally, the Branch tables contain priorities for application (primary, secondary, and so on) whereas reinforcing weld data and pad data do not.

Part of the workflow for creating a piping specification includes defining short codes in the branch table. The **Catalog** task provides a graphical user interface for viewing and modifying branch table data. The user interface looks like the human spec format, as shown in the following illustration.

To view branch table data, select the appropriate node in the Catalog tree view (Primary, Secondary, or Tertiary):

NOTES

- Many specification writers only define a primary branch table for a given angle.

- The Catalog database that you create with the **Database Wizard** does not include the ranges defined for the Branch Table. To view the data in the special human spec format, you must use the **Tools > Add Range to Branch Table** command to create the ranges.

When you select the Branch Table node, the grid view displays all the defined short codes (Primary, Secondary, and Tertiary) in the same view. When you select the Primary, Secondary, or Tertiary node, the branch table view appears.

The abbreviations and angles that appear in this view correspond to the sizing data and short codes on the **PipeBranch** sheet in the Excel workbook.

Head	SpecName	HeaderSize	BranchSize	AngleLow	AngleHigh	HdrSizeNPDUnitType	BrSizeNPDUnitType		ShortCode	SecondaryShortCode	TertiaryShortCode
Start											
	AC0014										
		0.75	0.75	89.5deg	90.5deg	in	in	Tee			
		1	0.75	89.5deg	90.5deg	in	in	Reducing Tee			
		1	1	89.5deg	90.5deg	in	in	Tee			
		1.5	0.75	89.5deg	90.5deg	in	in	Reducing Tee			
		1.5	1	89.5deg	90.5deg	in	in	Reducing Tee			
		1.5	1.5	89.5deg	90.5deg	in	in	Tee			
		2	0.75	89.5deg	90.5deg	in	in	Reducing Tee			
		2	1	89.5deg	90.5deg	in	in	Reducing Tee			
		2	1.5	89.5deg	90.5deg	in	in	Reducing Tee			
		2	2	89.5deg	90.5deg	in	in	Tee			
		3	0.75	89.5deg	90.5deg	in	in	Thredolet			
		3	1	89.5deg	90.5deg	in	in	Thredolet			
		3	1.5	89.5deg	90.5deg	in	in	Thredolet			
		3	2	89.5deg	90.5deg	in	in	Thredolet			
		3	3	89.5deg	90.5deg	in	in	Tee			

Add Range Dialog Box **(on page 981)**

Add a Range to the Branch Table

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Branch Table**.

   TIP The grid view shows all the defined short codes.

3. Click **Tools > Add Range to Branch Table**.

4. In the **Add Range** dialog box, type the starting angle in the range in the **From** box.

5. Type the ending angle in the range in the **To** box.

   TIP When applying branch table data to the model, if the primary value fails, then secondary value is applied.

6. Type the name to display in the tree view that identifies this branch table.

7. Click **OK**. The changes are saved to the database and a new node is added to the tree.

8. Select the branch table in the tree view to view the branch table in human spec format.

NOTES

- The specified short code is passed to the **Piping Commodity Filter** and is used to help select the commodity code.

- When the **Branch Table** node is selected in the Catalog tree view, you can use the editable cells in the grid view to modify the branch table data. The software automatically saves the modifications you make when you change to another row, select another node in the tree view, or select another command.

- The **Pipe Branch** sheet in the **Piping Specification.xls** workbook corresponds to the **Branch Table** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available in **Help > Printable Guides**.

Import Branch Fittings Command

The **Tools** > **Import Branch Fittings** analyzes the data in the piping commodity filter and determines what additions, deletions, and modifications need to be made. When the piping specification writer creates new specifications and makes changes to the branch intersection rules, there are corresponding entries that need to be created and updated in the piping commodity filter. You use the **Import Branch Fittings** command to scan the Catalog database and make the appropriate changes.

Update the Piping Commodity Filter

1. Modify a branch table.

2. Click **Tools > Import Branch Fittings**.

3. Click **Yes** in the message box.
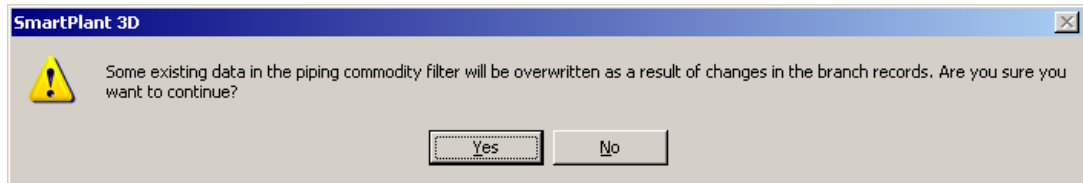
The software scans the Catalog database and makes the appropriate changes to the piping commodity filter.

4. When processing is complete, click **Close**.

📝 **NOTES**

- Depending on the number of specifications and branch tables that have been modified, the **Import Branch Fittings** command may take several minutes to complete.

- Clicking **No** in step 3, cancels the **Import Branch Fittings** command.

Piping Rules

Piping rules control how you want the software to behave during certain circumstances. You should review and customize, as needed, all delivered rules based on what makes sense for your company. There are three general categories for rules:

- Piping Materials Class Rules - These rules apply to specific material classes. Different rules can be defined for each material class.

- Model Rules - These rules apply to all the material classes across the project.

- Pipe Bending Manufacturability Rules - These rules apply to checking pipe bends for manufacturability.

See Also
Model Rules (on page 146)

Model Rules

Model Rules are used across all piping material classes in the project. You should customize these rules based on what makes sense for your company.

You must define data for the following required rules: Default Project Options, Short Code Hierarchy Rule, Default Change of Direction, Default Commodity Selection Rule, Mating Ports, NPD Equivalence, Bolt Extension, Preferred Stud Bolt Length, Preferred Machine Bolt Length, Preferred Cap Screw Length, Machine Bolt Length Calculation Tolerance, Stud Bolt Length Calculation Tolerance, Cap Screw Length Calculation Tolerance, Weld Model Representation Rule, and Weld Type Rule.

The optional piping specification rules are: Allowable Piping Materials Class, Minimum Pipe Length Rule, Minimum Pipe Length Purchase, Port Alignment, Pipe Bending Elongation, Flared

Pipe, Field Lining Thickness, Fluid Density Rule, Slip On Flange Setback Distance, Plate Flange Setback Distance, Weld Gap Rule, End Preparation Compatibility Exceptions Rule, Nominal Piping Diameter Compatibility Exceptions Rule, Field Fit Length, and Bolt Length Lookup Rule.

What do you want to do?

- *Define Bolt Commodity Code Substitution* (on page 150)
- *Define Bolt Diameter Equivalence* (on page 151)
- *Define Pipe Bend Radius Multiplier* (on page 164)
- *Define Automated Bolt Selection at Spec Break* (on page 148)
- *Define Bolt Selection Filters for Nozzles* (on page 152)
- *Define Calculation ProgIDs* (on page 153)
- *Define Bolt Thread Extensions* (on page 152)
- *Define Bolt Length Lookup Rule* (on page 151)
- *Define Cap Screw Length Calculation Tolerance* (on page 154)
- *Define Commodity Code Rules* (on page 154)
- *Define Component Insulation Exclusion* (on page 155)
- *Define Default Change of Direction* (on page 155)
- *Define Default Piping Commodity Selection* (on page 156)
- *Define Default Model Options* (on page 156)
- *Define End Preparation Compatibility* (on page 156)
- *Define End Preparation Compatibility Exceptions* (on page 157)
- *Define Field Fit Length* (on page 158)
- *Define Flared Pipe Information* (on page 158)
- *Define Fluid Density* (on page 159)
- *Define Gasket Selection Filters for Nozzles* (on page 159)
- *Define Machine Bolt Calculation Tolerance* (on page 160)
- *Define Material Description Rules* (on page 160)
- *Define Materials Data* (on page 161)
- *Define Minimum Pipe Length* (on page 161)
- *Define Minimum Pipe Length Purchase* (on page 162)
- *Define NPD Equivalence* (on page 163)
- *Define NPD Compatibility Exceptions* (on page 162)
- *Define Pipe Bending Elongation Information* (on page 164)
- *Define Piping Commodity Service Limits* (on page 165)
- *Define Plate Flange Setback Distance* (on page 165)
- *Define Port Alignment* (on page 165)

- *Define Preferred Cap Screws Length* (see "*Define Preferred Cap Screw Length*" on page 166)
- *Define Preferred Machine Bolt Length* (on page 167)
- *Define Preferred Stud Bolt Length* (on page 167)
- *Define Preferred Tap End Stud Bolt length* (on page 168)
- *Define Root Gap Rule* (on page 168)
- *Define Short Code Hierarchy* (on page 169)
- *Define Size Reduction Rule* (on page 169)
- *Define Slip on Flange Setback Distance* (on page 170)
- *Define Socket Offset* (on page 170)
- *Define Standard Notes* (on page 171)
- *Define Stud Bolt Calculation Tolerance* (on page 171)
- *Define Tap End Stud Bolt Calculation Tolerance* (on page 172)
- *Define WBS Creation Defaults* (on page 172)
- *Define Weld Model Representation* (on page 173)
- *Define Weld Type* (on page 173)

Define Automated Bolt Selection at Spec Break

1. In the tree view, click **Piping > Piping Specification > Model Rules > Automated Bolt Selection at Spec Break Rule**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **Piping Materials Class, End A** column, enter piping materials class for one end of the bolted joint.

4. In the **Revision Number, End A** column, enter the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint.

5. In the **Piping Materials Class, End B** column, enter piping materials class for one end of the bolted joint.

6. In the **Revision Number, End B** column, enter the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint.

7. In the **End preparation, End A** column, select the select list value that represents the end preparation, such as **Raised Face Flange**, for one end of the bolted joint.

8. In the **Termination subclass, End A** column, select the select list value that represents the termination subclass, such as **Flanged**, for one end of the bolted joint.

9. In the **Termination class, End A** column, select the select list value that represents the termination class, such as **Bolted**, for one end of the bolted joint.

10. In the **End preparation, End B** column, select the select list value that represents the end preparation, such as **Raised Face Flange**, for one end of the bolted joint.

11. In the **Termination subclass, End B** column, select the select list that represents the termination subclass, such as **Flanged**, for one end of the bolted joint.

12. In the **Termination class, End B** column, select the select list value that represents the termination class, such as **Bolted**, for one end of the bolted joint.

13. In the **Pressure rating, End A** column, select the select list value that represents the pressure rating for one end of the bolted joint.

14. In the **Pressure rating practice, End A** column, select the select list value that represents the pressure rating practice, such as **U.S. Practice, DIN** for one end of the bolted joint.

15. In the **Pressure rating, End B** column, select the select list value that represents the pressure rating for one end of the bolted joint.

16. In the **Pressure rating practice, End B**, select the select list value that represents the pressure rating practice, such as **U.S. Practice, DIN** for one end of the bolted joint.

17. In the **End Standard, End A** column, select the select list value that represents the end standard, or source of the catalog, applicable to one end of the bolted joint.

18. In the **End Practice, End A** column, select the select list value that represents the end practice, such as **U.S. Practice, DIN** for one end of the bolted joint.

19. In the **End Standard, End B** column, select the select list value that represents the end standard, or source of the catalog, applicable to one end of the bolted joint.

20. In the **End Practice, End B** column, select the select list value that represents the end practice, such as **U.S. Practice, DIN** for the other end of the bolted joint.

21. In the **Material Grade, End A** column, select the select list value that represents the material code, specification, grade-temper, and class for one end of the bolted joint.

22. In the **Material Category, End A** column, select the select list value that represents the industry practice, such as **U.S. Practice, DIN** for the materials grade.

23. In the **Material Practice, End A** column, select the select list value that represents the classification of the materials grade.

24. In the **Material Grade, End B** column, select the select list value that represents the material code, specification, grade-temper, and class for one end of the bolted joint.

25. In the **Material Category, End B** column, select the select list value that represents the classification of the materials grade.

26. In the **Material Practice, End B** column, select the select list value that represents the industry practice, such as **U.S. Practice, DIN** for the materials grade.

27. In the **Nominal Piping Diameter, From** column, enter the lower bound of the nominal piping diameter for which the bolting selection data applies.

28. In the **Nominal Piping Diameter, To** column, enter the upper bound of the nominal piping diameter for which the bolting selection data applies.

29. In the **Nominal Piping Diameter Units of Measure** column, enter the unit of measure for the nominal piping diameter range.

30. In the **Maximum Temperature** column, enter the maximum temperature for which the bolting is applicable.

31. In the **Maximum Pressure** column, enter the maximum pressure for which the bolting is applicable.

32. Click **Save** 🖫.

📝 **NOTES**

- For more information about the columns displayed in the grid view, see *Automated Bolt Selection at Spec Break Rule* (on page 444).

- The **Auto Bolt Selection at Spec Brk Rule** sheet in the **Automated Selection of Parts at Spec Break Rules.xls** workbook corresponds to the **Automated Bolt Selection at Spec Break Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Bolt Commodity Code Substitution

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Commodity Code Substitution Rule**.

2. Click **Insert Row** ⫐ to insert a blank row in the grid view.

3. In the **Contractor Commodity Code** column, enter the bolt's commodity code as defined in the bolt selection filter.

4. In the **Bolt Diameter** column, enter the bolt diameter. Include the units for the diameter, for example, type **mm** or **in**.

5. In the **Bolt Length** column, enter the bolt length. Include the units for the diameter, for example, type **mm** or **in**.

6. In the **Bolt Commodity Code** column, type the commodity code to use for the material control system.

7. Click **Save** 🖫.

📝 **NOTES**

- For more information about the columns displayed in the grid view, see *Bolt Commodity Code Substitution Rule* (on page 457).

- The **Bolt Commodity Code Substitution Rule** sheet in the **Bolt Commodity Code Substitution.xls** workbook corresponds to the **Bolt Commodity Code Substitution Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Bolt Diameter Equivalence

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Diameter Equivalence Rule**.

2. Click **Insert Row** ⌐ᴵᴇ to insert a blank row in the grid view.

3. In the **Bolt Diameter In Primary Units** column, enter the bolt diameter in the first unit of measurement.

4. In the **Bolt Diameter In Secondary Units** column, enter the bolt diameter in the second unit of measurement.

5. In the **Primary Units of Measure** column, enter the unit of measurement, **mm** or **in** for example, for the values in the **Bolt Diameter Primary Units** column.

6. In the **Secondary Units of Measure** column, enter the unit of measurement, **mm** or **in** for example, for the values in the **Bolt Diameter Secondary Units** column.

7. Click **Save** 🖫.

NOTES

▪ For more information about the columns displayed in the grid view, see *Bolt Diameter Equivalence Rule* (on page 457).

▪ The **Bolt Diameter Equivalence Rule** sheet in the **Bolt Diameter Equivalence.xls** workbook corresponds to the **Bolt Diameter Equivalence Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software

Define Bolt Length Lookup Rule

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Length Lookup Rule**

2. Click **Insert Row** ⌐ᴵᴇ to insert a blank row in the grid view.

3. In the **Spec Name 1** column, enter a unique piping material class name for the first part of the bolted joint.

4. In the **Short Code 1** column, enter the name of the piping commodity type such as butterfly valve.

5. In the **NPD 1** column, type the nominal piping diameter for the first part of the bolted joint.

6. In the **NPD 1 Units** column, enter the unit of measurement, for example **mm** or **in**, for the values in the **NPD 1** column.

7. Set the other options as required.

8. Click **Save** 🖫.

NOTES

▪ For more information about each property that you can define, see *Bolt Length Lookup Rule* (on page 460).

- The BoltLengthLookupRule sheet in the **Sample Data for BoltLengthLookupRule.xls** workbook corresponds to the **Bolt Length Lookup Rule** node. You must bulkload this workbook to see this node in the **Catalog** task.

Define Bolt Selection Filters for Nozzles

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Selection Filter for Nozzles**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Equipment Tag Number** column, enter a unique identification for the equipment that has a nozzle that requires special bolting conditions.

4. In the **Nozzle Tag Number** column, enter a unique identification for the nozzle that requires special bolting conditions.

5. In the **Contractor Commodity Code** column, type bolt commodity code to use.

6. Set the other options as required.

▤ NOTES

- For more information about each property that you can define, see *Bolt Selection Filter for Nozzles* (on page 462).

- The **Bolt Selection Filter For Nozzles** sheet in the **BoltSelection Filter for Nozzles Sample data.xls** workbook corresponds to the **Bolt Selection Filter for Nozzles** node. You must bulkload this workbook to see this node in the **Catalog** task.

Define Bolt Thread Extensions

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Extension Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Nominal Piping Diameter** column, type the NPD for which you want to define bolt extensions.

4. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

5. In the **Pressure Rating** column, type the pressure rating for which you want to define bolt extensions.

6. In the **End Preparation** column, type the end preparation code for which you want to define bolt extensions.

7. In the **End Standard** column, type the end standard code for which you want to define bolt extensions.

8. In the **Standard Bolt Extension for Studs** column, specify the length of exposed threads for studs. Be sure to include the units, **in** or **mm**, when specifying this value.

9. In the **Standard Bolt Extension for Machine Bolts** column, specify the length of exposed threads for machine bolts. Be sure to include the units, **in** or **mm**, when specifying this value.

NOTES

- Valid end preparation codes are listed in the **End Preparation** select list.

- Valid end standard codes are listed in the **End Standard** select list.

- For more information about the columns displayed in the grid view, see *Bolt Extension* (on page 458).

- The **Bolt Extension** sheet in the **Piping Specification.xls** workbook corresponds to the **Bolt Extension Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Calculation ProgIDs

1. In the tree view, click **Piping > Piping Specification > Model Rules > Bolt Diameter Equivalence Rule**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **Design Standard** column, select the design standard for which to assign calculation programs.

4. In the **Wall Thickness ProgID** column, enter the ProgID of the software program to use to calculate the wall thickness for this design standard.

5. In the **Branch Reinforcement ProgID** column, enter the ProgID of the software program to use to calculate the branch reinforcement for this design standard.

6. Click **Save**.

NOTES

- For more information about the columns displayed in the grid view, see *Calculation Prog IDs* (on page 466).

- The **Bolt Commodity Code Substitution Rule** sheet in the **Bolt Commodity Code Substitution.xls** workbook corresponds to the **Bolt Commodity Code Substitution Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Cap Screw Length Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Model Rules > Cap Screw Length Calculation Tolerance Rule**.

2. Click **Insert Row** ᴶ⬅ to insert a blank row in the grid view.

3. In the **Bolt Length From** column, specify the beginning bolt length for the range of bolt lengths that are to use the specified tolerance.

4. In the **Bolt Length To** column, specify the ending bolt length for the range of bolt lengths that are to use the specified tolerance.

5. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the specified tolerance.

6. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the specified tolerance.

7. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

🗏 NOTES

- For more information about each cap screw calculation tolerance property that you can define, see *Cap Screw Length Calculation Tolerance* (on page 396).

- The **Cap Screw Len Cal Tolerance** sheet in the **Piping Specification.xls** workbook corresponds to the **Cap Screw Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Commodity Code Rules

1. Click **Tools > Options**.

2. Select the **Piping Specifications** tab.

3. For the **Provide tools for building and selecting codes for** option, select one of the enabled options based on your needs. For example, if you work with both contractor and industry commodity codes, you should select **Enabled for Contractor Commodity Code and Industry Commodity Code**. If you work with only industry commodity codes, select **Enable for Industry Commodity Code**.

4. Optionally, select the **Create material description by rule** option if you would like to use it.

5. For **Available Rules**, select **Contractor Commodity Codes**. Skip to step 8 if you are not using contractor commodity codes.

6. Click **Load**, and then click **Apply**.

7. For **Available Rules**, select **Industry Commodity Codes**. Skip to step 11 if you are not using industry commodity codes.

8. Click **Load**, and then click **Apply**.

9. For **Available Rules**, select **Material Descriptions**. Skip to step 14 if you did not select the **Create material description by rule** option in step 4.

10. Click **Load**, and then click **OK**.

11. In the tree view, navigate to Piping > Piping Specification > Model Rules > Commodity Code Rules.

12. In the **Formats** and **Properties** folders under either **Contractor Commodity Codes** or **Industry Commodity Codes**, or both, review and edit the properties as needed.

13. In the grid view wherever you are prompted to enter a commodity code such as in the **Piping Commodity Material Control Data**, select **Select Commodity Code...** from the list.

Define Component Insulation Exclusion

1. In the tree view, click **Piping > Piping Specification > Model Rules > Component Insulation Exclusion Rule**.

2. Click **Insert Row** ⁼₊ₑ to insert a blank row in the grid view.

3. Select the piping commodity class, then the piping commodity sub class, and then the piping commodity type for which to define a component insulation exclusion rule.

4. Select the heat tracing requirement, then the heat tracing type, and then the heat tracing medium for the rule.

5. Select the insulation requirement, then the insulation type, and then the insulation purpose for the rule.

6. Define the size ranges as required.

7. Define the insulation temperature range as required.

8. Click **Save** 🖫.

NOTE For more information about each component insulation exclusion rule setting that you can define, see *Component Insulation Exclusion* (on page 327).

Define Default Change of Direction

1. In the tree view, click **Piping > Piping Specification > Model Rules > Default Change of Direction Rule**.

2. Click **Insert Row** ⁼₊ₑ to insert a blank row in the grid view.

3. In the **Bend Angle From** column, enter the lower boundary for the bend angle. This value must match the **Bend Angle To** value on the previous row.

4. In the **Bend Angle To** column, enter the upper boundary for the bend angle. This value must match the **Bend Angle From** value for the next row

5. In the **Functional Short Code** column, enter the functional short code to use to access the piping commodity filter for the change-of-direction fitting.

NOTES

- For more information about each default change of direction property that you can define, see *Default Change of Direction* (on page 468).

- The **Default Change of Direction** sheet in the **Piping Specification.xls** workbook corresponds to the **Default Change of Direction Rule** node. For more information about the

Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Default Piping Commodity Selection

1. In the tree view, click **Piping > Piping Specification > Model Rules > Default Piping Commodity Selection Rule**.

2. Click **Insert Row** ⁔ to insert a blank row in the grid view.

3. In the **Feature Type** column, enter the feature type.

4. In the **Generic Short Code** column, enter the short code to use for the defined feature type.

▤ NOTES

- Feature types are defined in the **Feature Type** select list.

- For more information about each default piping commodity selection property that you can define, see *Default Piping Commodity Selection Rule* (on page 468).

- The **Default Commodity Selection Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Default Piping Commodity Selection Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Default Model Options

1. In the tree view, click **Piping > Piping Specification > Model Options**.

2. In the grid view, define the model options.

▤ NOTES

- For more information about each default model option property that you can define, see *Model Options* (on page 434).

- The **Default Project Options** sheet in the **Piping Specification.xls** workbook corresponds to the **Model Options** node. For more information about the Piping workbooks, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define End Preparation Compatibility

1. In the tree view, click **Piping > Piping Specification > Model Rules > End Preparation Compatibility Rule**.

2. Click **Insert Row** ⁔ to insert a blank row in the grid view.

3. In the **End Prep 1** column, specify the first end preparation code for which you want to define a mating port.

4. In the **End Prep 2** column, specify the second end preparation code for which you want to define a mating port.

▤ NOTES

- For more information about each end preparation compatibility property that you can define, see *End Preparation Compatibility Rule* (on page 472).

▪ The **Mating Ports** sheet in the **Piping Specification.xls** workbook corresponds to the **End Preparation Compatibility Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define End Preparation Compatibility Exceptions

1. In the tree view, click **Piping > Piping Specification > Model Rules > End Preparation Compatibility Exceptions Rule**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **End Preparation End A** column, select the end preparation, such as **Raised Face Flange**, for the port applicable to fitting A.

4. In the **Termination Subclass End A** column, select the termination subclass, such as **Flanged**, for the port applicable to fitting A.

5. In the **Termination Class End A** column, select the termination class, such as **Bolted**, for the port applicable to fitting A.

6. Define one of the properties listed below. The End Preparation Compatibility Exceptions Rule must be based on the **End Standard** property *or* the **Materials Category** property.

    ▪ In the **End Standard A** column, select the end standard applicable to the end of fitting A.

    ▪ In the **Materials Category Fitting A** column, select the classification for the materials grade applicable to fitting A.

    ▪ In the **Lining Material Fitting A** column, select the lining material applicable to the fitting A. This column is currently not used.

7. In the **End Preparation End B** column, select the end preparation for the port applicable to fitting B.

8. In the **Termination Subclass End B** column, select the termination subclass for the port applicable to fitting B.

9. In the **Termination Class End B** column, select the termination class for the port applicable to fitting B.

10. Depending on the property that you defined in step 6, do one of the following:

    ▪ In the **End Standard B** column, select the end standard applicable to the end of fitting B.

    ▪ In the **Materials Category Fitting B** column, select the classification for the materials grade applicable to fitting B.

    ▪ In the **Lining Material Fitting B** column, select the Lining Material applicable to fitting B. This column is currently not used.

11. In the **Selection Basis per Piping Commodity Filter** column, specify whether the applicable mating ends are compatible.

12. In the **Joint Requirement** column, specify whether the applicable mating ends are compatible or require a coupling, connector, adapter or nipple to form the joint.

13. In the **Connecting Part Short Code** column, select the short code for the coupling, connector, adapter, or nipple.

14. In the **Connecting Part Commodity Option** column, select the appropriate commodity option for the coupling, connector, adapter, or nipple.

15. Click **Save** 💾.

📄 **NOTES**

- For more information about each end preparation compatibility exceptions property that you can define, see *End Preparation Compatibility Exceptions Rule* (on page 469).

- The **End Preparation Compatibility Exceptions Rule** sheet in the **Piping Specification Template.xls** workbook corresponds to the **End Preparation Compatibility Exceptions Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Field Fit Length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Field Fit Length Rule**.

2. Click **Insert Row** ⊒← to insert a blank row in the grid view.

3. In the **Weld Type** column, enter the weld type code for which to define a field fit length.

4. Specify the NPD range for the field fit length.

5. Specify the constructions requirements.

6. In the **Field Fit Length** column, enter the field fit length. Be sure to include the units of measure, for example **in** or **mm**, when specifying this value.

📄 **NOTES**

- For more information about each field fit length property that you can define, see *Field Fit Length* (on page 398).

- The **Field Fit Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Field Fit Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Flared Pipe Information

1. In the tree view, click **Piping > Piping Specification > Model Rules > Flared Pipe Rule**.

2. Click **Insert Row** ⊒← to insert a blank row in the grid view.

3. In the **Nominal Pipe Diameter** column, enter the pipe diameter for which the information applies.

4. In the **Schedule Thickness** column, enter the schedule thickness for which the information applies.

5. In the **Lap Length** column, enter the lap length. Be sure to include the units of measure, for example **in** or **mm**, when specifying this value.

6. In the **Lap Thickness** column, enter the lap thickness. Be sure to include the units of measure, for example **in** or **mm**, when specifying this value.

NOTES

- For more information about each flared pipe property that you can define, see *Flared Pipe* (on page 474).

- The **Flared Pipe** sheet in the **Piping Specification.xls** workbook corresponds to the **Flared Pipe Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Fluid Density

1. In the tree view, click **Piping > Piping Specification > Model Rules > Fluid Density Rule**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **Fluid Code** column, enter the fluid code short description for which to define a density.

4. Specify the temperature range for the fluid density. Include the temperature unit, for example **F** or **C**, when defining this range.

5. In the **Density** column, enter the fluid density. Be sure to include the units of measure, for example **lbm/ft^3** or **kg/m^3**, when specifying this value.

NOTES

- The fluid code short descriptions are defined in the **Fluid Code** select list under the **Select Lists** branch in the Catalog tree view. For cryogenic liquids and compounds that can change phases, you must define a different fluid code, and thus a different density, for each of the different phases.

- For more information about each fluid density property that you can define, see *Fluid Density Rule* (on page 475).

- The **Fluid Density Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Fluid Density** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Gasket Selection Filters for Nozzles

1. In the tree view, click **Piping > Piping Specification > Model Rules > Gasket Selection Filter for Nozzles**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **Equipment Tag Number** column, identify the equipment that has the nozzle that requires special gasket considerations.

4. In the **Nozzle Tag Number** column, identify the nozzle that requires special gasket consideration.

5. In the **Contractor Commodity Code** column, identify the commodity code of the gasket to use.

6. Specify the optional information as needed.

NOTES

- Refer to the *Gasket Selection Filter for Nozzles* (on page 476) for information about each column.

- The **Gasket Selection Filter For Nozzles** sheet in the **GasketSelection Filter for Nozzles Sample data.xls** workbook corresponds to the **Gasket Selection Filter for Nozzles** node. You must bulkload this workbook to see this node in the **Catalog** task.

Define Machine Bolt Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Piping Rules > Machine Bolt Length Calculation Tolerance Rule**.

2. Click **Insert Row** to insert a blank row in the grid view.

3. In the **Bolt Length From** column, specify the beginning bolt length for the range of bolt lengths that are to use the specified tolerance.

4. In the **Bolt Length To** column, specify the ending bolt length for the range of bolt lengths that are to use the specified tolerance.

5. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the specified tolerance.

6. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the specified tolerance.

7. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

NOTES

- For more information about each machine bolt calculation tolerance property that you can define, see *Machine Bolt Length Calculation Tolerance* (on page 403).

- The **Mach Bolt Len Cal Tolerance** sheet in the **Piping Specification.xls** workbook corresponds to the **Machine Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Material Description Rules

1. Click **Grid View** on the ribbon.

2. In the tree view, click **Piping > Piping Specification > Model Rules > Material Description Rule**.

3. In the grid view, select an existing row.

4. Click **Insert Row** on the ribbon.

5. Select an entry in the **Piping Component Class** column.

6. In the **Short Label** column, type the alphanumeric string that the software should use as the short material description for the part. This string can be modified after the part is created in the catalog.

7. Optionally, enter values in the **Piping Component Subclass** and **Piping Component Type** columns to further define the rule criteria. No two rules (rows) in the Material Description Rule can have the same criteria.

8. Optionally, type an alphanumeric string in the **Long Label** column that the software should use as the long material description.

9. Select another row in the grid view to save your changes.

Define Materials Data

1. In the tree view, click **Piping > Piping Specification > Model Rules > Materials Data Rule**.

2. Click **Insert Row** ⊒⟵ to insert a blank row in the grid view.

3. Define the materials data.

🗐 NOTES

- For more information about each materials data property that you can define, see *Materials Data* (on page 478).

- The **Materials Data** sheet in the **Piping Specification.xls** workbook corresponds to the **Materials Data Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Minimum Pipe Length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Minimum Pipe Length Rule for Random Length Pipe**.

2. Click **Insert Row** ⊒⟵ to insert a blank row in the grid view.

3. In the **Nominal Piping Diameter** column, type the nominal pipe diameter for which you are defining minimum values.

4. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

5. In the **Minimum Pipe Length** column, type the minimum pipe length that you will allow for the specified NPD.

6. In the **Preferred Minimum Pipe Length** column, type your preferred minimum pipe length for the specified NPD.

🗐 NOTES

- For more information about each minimum pipe length property that you can define, see *Minimum Pipe Length Rule for Random Length Pipe* (on page 479).

- The **Minimum Pipe Length Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Minimum Pipe Length Rule for Random Length Pipe** node. For more information about the Piping workbooks delivered with the software, see the *Piping*

Reference Data Guide, available with the **Help > Printable Guides** command in the software.

Define Minimum Pipe Length Purchase

1. In the tree view, click **Piping > Piping Specification > Model Rules > Minimum Pipe Length Rule for Purchase Length Pipe**.

2. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

3. In the **Nominal Piping Diameter** column, type the nominal pipe diameter for which you are defining minimum values.

4. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

5. In the **Purchase Length** column, specify the purchase length for the piping for which the minimum pipe length applies.

6. In the **Minimum Pipe Length** column, type the minimum pipe length that you will allow for the specified NPD.

7. In the **Preferred Minimum Pipe Length** column, type your preferred minimum pipe length for the specified NPD.

🗎 NOTES

- For more information about each minimum pipe length purchase property that you can define, see *Minimum Pipe Length Rule for Purchase Length Pipe* (on page 479).

- The **Min Pipe Length Purchase** sheet in the **Piping Specification.xls** workbook corresponds to the **Minimum Pipe Length Rule for Purchase Length Pipe** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define NPD Compatibility Exceptions

1. In the tree view, click **Piping > Piping Specification > Model Rules > Nominal Piping Diameter Compatibility Exceptions Rule**.

2. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

3. In the **Nominal Piping Diameter End A** column, enter the nominal pipe diameter for the end of the applicable joint that represents End A.

4. In the **Nominal Piping Diameter Units End A** column, type the units for the NPD on End A. For example, type **mm** or **in**.

5. In the **Materials Practice End A** column, select the industry practice for the materials grade of the fitting at End A. For example, select **German Standards (DIN)**.

6. In the **Materials Category End A** column, select the classification for the materials grade of End A.

7. In the **Nominal Piping Diameter End B** column, enter the nominal pipe diameter for the end of the applicable joint that represents End B.

8. In the **Nominal Piping Diameter Unit End B** column, type the units for the NPD on End B. For example, type **mm** or **in**.

9. In the **Materials Practice End B** column, select the industry practice for the materials grade of the fitting at End B. For example, select **German Standards (DIN)**.

10. In the **Materials Category End B** column, select the classification for the materials grade of the fitting at End B.

11. Click **Save** 💾.

📝 **NOTES**

▪ For more information about the properties that you can define, see *Nominal Piping Diameter Compatibility Exceptions Rule* (on page 480).

▪ The **NPD Compatibility Exceptions Rule** sheet in the **Piping Specification Template.xls** workbook corresponds to the **Nominal Piping Diameter Compatibility Exceptions Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define NPD Equivalence

1. In the tree view, click **Piping > Piping Specification > Model Rules > Nominal Piping Diameter Equivalence Rule**.

2. Click **Insert Row** ⬚ to insert a blank row in the grid view.

3. In the **NPD In Primary Units of Measure** column, enter the primary nominal pipe diameter.

4. In the **Primary Units of Measure** column, type the units for the primary NPD. For example, type **mm** or **in**.

5. In the **NPD In Secondary Units of Measure** column, enter the secondary nominal pipe diameter.

6. In the **Secondary Units of Measure** column, type the units for the secondary NPD. For example, type **mm** or **in**.

📝 **NOTES**

▪ For more information about each NPD equivalence property that you can define, see *Nominal Piping Diameter Equivalence Rule* (on page 482).

▪ The **NPD Equivalences** sheet in the **Piping Specification.xls** workbook corresponds to the **Nominal Piping Diameter Equivalence Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bend Radius Multiplier

1. In the tree view, click **Piping > Piping Specification > Model Rules > Pipe Bend Radius Multiplier Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Nominal Piping Diameter** column, enter the nominal pipe diameter for which you want to define bend radii.

4. In the **Nominal Piping Diameter Units** column, enter the units for **NPD** column.

5. In the **Pipe Bend Radius Multiplier** column, enter the pipe bend radius multiplier for which the absolute pipe bend radius applies.

6. In the **Absolute Pipe Bend Radius** column, enter the pipe bend radius.

7. Click **Save** 💾.

📄 NOTES

-   For more information about the columns displayed in the grid view, see *Pipe Bend Radius Multiplier Rule* (on page 408).

-   The **Pipe Bend Radii** sheet in the **Piping.xls** workbook corresponds to the **Pipe Bending Radius Multiplier Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bending Elongation Information

1. In the tree view, click **Piping > Piping Specification > Model Rules > Pipe Bending Elongation Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Nominal Pipe Diameter** column, enter the pipe diameter for which the information applies.

4. Define the pipe elongation values.

📄 NOTES

-   For more information about each field fit length property that you can define, see *Pipe Bending Elongation* (on page 484).

-   The **Pipe Bending Elongation** sheet in the **Piping Specification.xls** workbook corresponds to the **Pipe Bending Elongation Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Piping Commodity Service Limits

1. In the tree view, click **Piping > Piping Commodity Service Limits Data**.

2. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

3. In the **Contractor commodity code** column, enter commodity code for which you want to define service limits.

4. Define the commodity specific service limits by providing appropriate values in the different columns.

NOTE

- For more information about each piping commodity service limit property that you can define, refer to *Piping Commodity Service Limits* (on page 340).

- The **Commodity Specific Service Limits** sheet in the **Piping Specification.xls** workbook corresponds to the **Piping Commodity Service Limits Data** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Plate Flange Setback Distance

1. In the tree view, click **Piping > Piping Specification > Model Rules > Plate Flange Setback Distance Rule**.

2. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

3. Define nominal piping diameter range for the flange setback distance.

4. In the **Setback Distance** column, enter the distance between the flange face and the edge of the interior weld.

NOTES

- For more information about each slip on flange setback distance property that you can define, see *Plate Flange Setback Distance* (on page 485).

- The **Slip On Flange Setback Distance** sheet in the **Piping Specification.xls** workbook corresponds to the **Slip-on Flange Setback Distance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Port Alignment

1. In the tree view, click **Piping > Piping Specification > Model Rules > Port Alignment Rule**.

2. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

3. Define the nominal piping diameter range for the port alignment that you are defining.

4. In the **End Preparation** column, type the end preparation code for the port alignment.

5. In the **Method of Trimming** column, enter the code for the method of trimming.

6. In the **Acceptable Alignment Tolerance** column, specify the maximum angular variation between the branch centerline and the header centerline.

📝 NOTES

▪ Valid end preparation codes are listed in the **End Preparation** select list.

▪ Valid trimming method codes are listed in the **Methods of Trimming** select list.

▪ For more information about port alignment property that you can define, see *Port Alignment* (on page 486).

▪ The **Port Alignment** sheet in the **Piping Specification.xls** workbook corresponds to the **Port Alignment Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Preferred Cap Screw Length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Preferred Cap Screw Length Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

4. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

6. In the **Materials Grade** column, type the material grade code for the bolt.

7. Define the preferred bolt length information in the remaining columns.

📝 NOTES

▪ Valid material grade codes are listed in the **Materials Grade** select list.

▪ For more information about each preferred cap screw length property that you can define, see *Preferred Cap Screw Length* (on page 413).

▪ The **Preferred Cap Screw Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Cap Screw Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Machine Bolt Length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Preferred Machine Bolt Length Rule**.

2. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

3. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

4. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

6. In the **Materials Grade** column, type the material grade code for the bolt.

7. Define the preferred bolt length information in the remaining columns.

NOTES

- Valid material grade codes are listed in the **Materials Grade** select list.

- For more information about each preferred machine bolt length property that you can define, see *Preferred Machine Bolt Length* (on page 414).

- The **Preferred Mach Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Machine Bolt Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Stud Bolt Length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Preferred Stud Bolt Length Rule**.

2. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

3. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

4. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

6. In the **Materials Grade** column, type the material grade code for the bolt.

7. Define the preferred bolt length information in the remaining columns.

NOTES

- Valid material grade codes are listed in the **Materials Grade** select list.

- For more information about preferred stud bolt length property that you can define, see *Preferred Stud Bolt Length* (on page 415).

- The **Preferred Stud Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Stud Bolt Length Rule** node. For more information about the

Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Tap End Stud Bolt length

1. In the tree view, click **Piping > Piping Specification > Model Rules > Preferred Tap End Stud Bolt Length Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. In the **Bolt Diameter From** column, enter the bolt diameter lower bounds for which to specify a preferred length.

4. In the **Bolt Diameter** column, enter the bolt diameter upper bounds for which to specify a preferred length.

5. In the **Bolt Diameter Increment** column, enter the value by which to increment the bolt diameter.

6. In the **Material Grade** column, enter the material grade code for the bolt.

7. In the **Preferred Bolt Length From** column, enter the preferred bolt length lower bound for this bolt diameter and material grade.

8. In the **Preferred Bolt Length To** column, enter the preferred bolt length upper bound for this bolt diameter and material grade.

9. In the **Preferred Bolt Length Increment** column, enter the value by which to increment the preferred bolt length.

10. Click **Save** 💾.

▤ NOTES

*   For more information about the columns displayed in the grid view, see *Preferred Tap End Stud Bolt Length Rule* (on page 416).

*   The **Preferred Tap End Stud Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Tap End Stud Bolt Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Root Gap Rule

1. In the tree view, click **Piping > Piping Specification > Model Rules > Root Gap Rule**.

2. Click **Insert Row** ⌐ to insert a blank row in the grid view.

3. Enter the bottom and top size range for the rule.

4. Enter the root gap to use.

▤ NOTES

*   For more information about each root gap rule property that you can define, see *Root Gap Rule* (on page 491).

*   The **Root Gap Rule** sheet in the **Sample Data Piping Specification.xls** workbook corresponds to the **Root Gap Rule** node. For more information about the Piping workbooks

delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Short Code Hierarchy

1. In the tree view, click **Piping > Piping Specification > Model Rules > Short Code Hierarchy Rule**.

2. Click **Insert Row** ⅂₊ₑ to insert a blank row in the grid view.

3. In the **Short Code Hierarchy Type** column, enter the short code hierarchy type for which you want the short code to appear in the software.

4. In the **Short Code** column, enter the short code that you want to associate with the hierarchy type you defined in the **Short Code Hierarchy Type** column.

5. Click **Save** 💾.

NOTES

- For more information about the columns displayed in the grid view, see *Short Code Hierarchy Rule* (on page 491).

- The **Short Code Hierarchy Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Short Code Hierarchy Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Size Reduction Rule

1. In the tree view, click **Piping > Piping Specification > Model Rules > Size Reduction Rule**.

2. Click **Insert Row** ⅂₊ₑ to insert a blank row in the grid view.

3. Select the size reduction type (concentric or eccentric).

4. Enter the first and second sizes for the size reduction rule.

5. Enter the second fitting's first size.

6. Optionally, enter the third and fourth fittings' first size.

7. Optionally, enter the size reduction preference order.

NOTES

- For more information about each size reduction rule property that you can define, see *Size Reduction Rule* (on page 493).

- The **Size Reduction Rule** sheet in the **Sample Data Piping Specification.xls** workbook corresponds to the **Size Reduction Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Slip on Flange Setback Distance

1. In the tree view, click **Piping > Piping Specification > Model Rules > Slip-on Flange Setback Distance Rule**.

2. Click **Insert Row** ⌐╕ to insert a blank row in the grid view.

3. Define nominal piping diameter range for the flange setback distance.

4. In the **Company Practice Gap** column, enter the distance between the flange face and the edge of the interior weld.

5. In the **Company Practice Round Off Factor** column, enter the value to use to round up the sum of the weld thickness and the gap.

6. In the **End Standard** column, type the end standard for the bolted end of the slip-on flange.

7. In the **Maximum Weld Thickness** column, type the maximum weld thickness.

▤ NOTES

- For more information about each slip on flange setback distance property that you can define, see *Slip-on Flange Setback Distance* (on page 494).

- The **Slip On Flange Setback Distance** sheet in the **Piping Specification.xls** workbook corresponds to the **Slip-on Flange Setback Distance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Socket Offset

1. In the tree view, click **Piping > Piping Specification > Model Rules > Socket Offset Rule**.

2. Click **Insert Row** ⌐╕ to insert a blank row in the grid view.

3. In the **End Practice** column, enter the end practice for the end.

4. In the **End Preparation** column, enter the end preparation for the end.

5. In the **End Standard** column, enter the end standard for the end.

6. In the **Nominal Piping Diameter** column, enter the nominal pipe diameter for which the socket offset rule applies.

7. In the **Nominal Piping Diameter Units** column, enter the units for the **NPD** column.

8. In the **Socket Offset** column, enter the offset of the socket for the female end.

9. In the **Termination Class** column, select the termination class code.

10. In the **Termination Sub Class** column. select the termination subclass code

11. Click **Save** 💾.

▤ NOTES

- For more information about the columns displayed in the grid view, see *Socket Offset Rule* (on page 495).

- The **Socket Offset Rule** sheet in the **Socket Offset Rule.xls** workbook corresponds to the **Socket Offset Rule** node. For more information about the Piping workbooks delivered with

the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Standard Notes

1. In the tree view, click **Piping > Piping Specification > Notes**.

2. Click **Grid View** ⊞ on the ribbon.

3. Click **Insert Row** ⋺ᴇ to insert a blank row in the grid view.

4. In the **Name** column, type a unique number to identify the note.

5. In the **Purpose** column, select the purpose of the note.

6. In the **Text** column, type the note text.

☰ NOTES

- For more information about each note property that you can define, see *Standard Notes* (on page 355).

- The **Standard Notes Data** sheet in the **Piping Specification.xls** workbook corresponds to the **Notes** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Stud Bolt Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Model Rules > Stud Bolt Length Calculation Tolerance Rule**.

2. Click **Insert Row** ⋺ᴇ to insert a blank row in the grid view.

3. In the **Bolt Length From** column, specify the beginning bolt length for the range of bolt lengths that are to use the specified tolerance.

4. In the **Bolt Length To** column, specify the ending bolt length for the range of bolt lengths that are to use the specified tolerance.

5. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the specified tolerance.

6. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the specified tolerance.

7. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

☰ NOTES

- For more information about each stud bolt calculation tolerance property that you can define, see *Stud Bolt Length Calculation Tolerance* (on page 421).

- The **Stud Bolt Len Cal Tolerance** sheet in the **Piping Specification.xls** workbook corresponds to the **Stud Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Tap End Stud Bolt Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Model Rules > Tap End Stud Bolt Length Calculation Tolerance Rule**.

2. Click **Insert Row** ⌐← to insert a blank row in the grid view.

3. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the specified tolerance.

4. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the specified tolerance.

5. In the **Bolt Length From** column, specify the beginning bolt length for the range of bolt lengths that are to use the specified tolerance.

6. In the **Bolt Length To** column, specify the ending bolt length for the range of bolt lengths that are to use the specified tolerance.

7. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

NOTES

- For more information about each tap end stud bolt calculation tolerance property that you can define, see *Tap End Stud Bolt Calculation Tolerance Rule* (on page 422).

- The **Tap End Stud Bolt Len Cal Tolerance** sheet in the **Piping Specification.xls** workbook corresponds to the **Tap End Stud Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define WBS Creation Defaults

1. In the tree view, click **Piping > Piping Specification > Model Rules > Auto WBS Creation Rule**.

2. Click **Insert Row** ⌐← to insert a blank row in the grid view.

3. Define the default settings as needed.

4. Click **Save** 💾.

NOTE For more information about each setting that you can define, see *WBS Creation Rule* (on page 498).

Define Weld Model Representation

1. In the tree view, click **Piping > Piping Specification > Model Rules > Weld Model Representation Rule**.

2. Click **Insert Row** ⅃← to insert a blank row in the grid view.

3. Define nominal piping diameter range for the weld model representation.

4. In the **Weld Class** column, type the weld class code.

5. Specify the weld radius and weld thickness.

🗒 NOTES

- Valid codes are listed in the **Weld Type** select list.

- For more information about each weld model representation property that you can define, see *Weld Model Representation Rule* (on page 499).

- The **Weld Model Representation Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Weld Model Representation Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Weld Type

1. In the tree view, click **Piping > Piping Specification > Model Rules > Weld Model Representation Rule**.

2. Click **Insert Row** ⅃← to insert a blank row in the grid view.

3. Define the weld type parameters.

🗒 NOTES

- For more information about each weld type property that you can define, see *Weld Type Rule* (on page 500).

- The **Weld Type Rule** sheet in the **Piping Specification.xls** workbook corresponds to the **Weld Type Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Piping Materials Class Rules

Piping Materials Class Rules apply to individual material classes that you have defined in your piping specification. You should customize the rules based on what makes sense for your company.

What do you want to do?

- Define Allowable Fluid Codes
- *Define Allowable Pipe Bend Radii* (on page 175)
- *Define Auto Router Cost Evaluation* (on page 176)
- *Define Auto Router Pipe Rack Spacing* (on page 176)
- *Define Bend Angles* (on page 177)
- Define Bolt Length Lookup Rule
- *Define Bolt Selection Filters* (on page 177)
- *Define Branch Selection Criteria* (on page 178)
- *Define Cap Screw Length Calculation Tolerance* (on page 178)
- *Define Clamp Selection Filters* (on page 179)
- *Define Corrosion Allowances* (on page 179)
- *Define Default Change of Direction Per Spec* (on page 180)
- *Define Exterior Coating and Surface Treatments* (on page 180)
- *Define Field Fit Length* (on page 181)
- *Define Field Lining Thickness* (on page 182)
- *Define Flared Pipe Per Spec* (on page 182)
- *Define Flexible Hose Assembly Information* (on page 183)
- *Define Gasket Selection Filters* (on page 184)
- *Define Interior Coating and Surface Treatments* (on page 184)
- *Define Joint Quality Factors* (on page 185)
- *Define Machine Bolt Length Calculation Tolerance* (on page 185)
- *Define Mechanical Joint Allowable Pipe End Separation* (on page 186)
- *Define Minimum Pipe Length Rule for Purchase Length Pipe Per Spec* (on page 187)
- *Define Pipe Length Rule for Random Length Pipe Per Spec* (on page 187)
- *Define Pipe Bending Elongation Per Spec* (on page 188)
- *Define Pipe Branch Fabrication Rule* (on page 188)
- *Define Preferred Cap Screw Length* (on page 189)
- *Define Preferred Machine Bolt Length* (on page 189)

- *Define Preferred Stud Bolt Length* (on page 190)
- *Define Preferred Tap End Stud Bolt Length* (on page 191)
- *Define Nut Selection Filters* (on page 191)
- *Define Allowable Nominal Piping Diameters* (on page 192)
- *Define Permissible Taps* (on page 192)
- *Define Port Alignment Per Spec* (on page 193)
- *Define Permissible Pipe Bending Machine Information* (on page 193)
- *Define Reinforcing Pad Widths* (on page 194)
- *Define Reinforcing Weld Size* (on page 194)
- *Define Root Gaps Per Spec* (on page 195)
- *Define Service Limits* (on page 195)
- *Define Size Reduction Per Spec* (on page 196)
- *Define Stud Bolt Length Calculation Tolerance* (on page 196)
- *Define Tap End Stud Bolt Length Calculation Tolerance* (on page 197)
- *Define Takedown Parts* (on page 197)
- *Define Thickness Data* (on page 198)
- *Define Washer Selection Filters* (on page 198)
- *Define Weld Clearance* (on page 199)
- *Define Weld Gap* (on page 199)

Define Allowable Pipe Bend Radii

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Pipe Bend Radius Multiplier Rule**.

3. Click **Insert Row** ⌐← to insert a blank row in the grid view.

4. In the **NPD** column, type the nominal pipe diameter for which you are defining a bend radius.

5. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

6. In the **Bend Radius Multiplier** column, type the NPD multiplier to calculate the bend radius.

7. In the **Bend Radius** column, type the bend radius for the NPD. Leave this column empty if you define a **Bend Radius Multiplier**.

🗐 NOTES

- For more information about each allowable pipe bend radius property that you can define, see *Pipe Bend Radius Multiplier Rule* (on page 408).

- The **Pipe Bend Radii** sheet in the **Piping Material Class.xls** workbook corresponds to the **Pipe Bend Radius Multiplier Rule** node in the **Catalog** task. For more information about

the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Auto Router Cost Evaluation

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Auto Router Cost Evaluation Rule**.

3. Click **Insert Row** ⌐ᵣₑ to insert a blank row in the grid view.

4. In the **NPD** column, type the nominal pipe diameter for which you are defining a cost factor.

5. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

6. In the **Linear Cost factor** column, type the NPD linear cost for the NPD size as relative cost per unit length of the route.

7. In the **Bend Cost factor** column, type the bend cost for the NPD as the equivalent cost of the bend, expressed as a length of pipe.

NOTES

▪ For more information about auto router cost evaluation that you can define, see Auto Router Cost Evaluation.

▪ The **Auto Router Cost Evaluation** sheet in the **Piping Specification.xls** workbook corresponds to the **Auto Router Cost Evaluation Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Auto Router Pipe Rack Spacing

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Auto Router Pipe Rack Spacing Rule**.

3. Click **Insert Row** ⌐ᵣₑ to insert a blank row in the grid view.

4. In the **SpecName** column, type the Piping Materials Class to define pipe rack spacing

5. In the **Nominal Diameter From** column, type the lower bound of piping diameter.

6. In the **Nominal Diameter To** column, type the upper bound of piping diameter.

7. In the **NPD Units** column, type the units for **Nominal Diameter From** and **Nominal Diameter To** columns.

8. In the **Branch Gap** column, type the separation between adjacent branches connecting to the same header.

9. In the **Joint Air Gap** column, type the separation between adjacent joints.

10. In the **Pipe Air Gap** column, type the separation between adjacent pipes of the same NPD.

📄 **NOTES**

- For more information about auto router cost evaluation that you can define, see Auto Router Pipe Rack Spacing.

- The **Auto Router Pipe Rack Spacing** sheet in the **Piping Specification.xls** workbook corresponds to the **Auto Router Pipe Rack Spacing** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Bend Angles

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Bend Angles Rule**.

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. In the **Bend Angle** column, type the bend angle you want to allow.

5. In the **NPD** column, type the nominal pipe diameter for which you are defining a bend angle.

6. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

📄 **NOTES**

- For more information about bend angles that you can define, see *Bend Angles* (on page 394).

- The **Bend Angles** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Bend Angles Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Bolt Selection Filters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Bolt Selection Filter**.

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. Define the bolt selection filter by providing appropriate values in the different columns.

📄 **NOTES**

- For more information about each bolt selection filter property that you can define, see *Bolt Selection Filter* (on page 375).

- The **Bolt Selection Filter** sheet in the **Piping Specification.xls** workbook corresponds to the **Bolt Selection Filter** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Branch Selection Criteria

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Branch Table**.

   TIP If the short codes do not display in the grid view, click **Tools > Options** and then select the **Short Codes** tab. Add or edit short codes as needed, or to accept the default short codes, simply click **OK**.

3. Click **Tools > Add Range to Branch Table**.

4. In the **Add Range** dialog box, type the starting angle for the branch table range in the **From** box.

5. Type the ending angle for the branch table range in the **To** box.

6. Type the name to display in the tree view that identifies this branch table, for example, 90 Degrees.

7. Click **OK**. The changes are saved to the database and nodes are added to the tree view.

8. In the tree view, expand the name that you entered, and then select the **Primary** node.

9. Define the short codes for each header/branch size combination.

NOTES

- The specified short code is passed to the **Piping Commodity Filter** and is used to help select the commodity code.

- When the **Branch Table** node is selected in the Catalog tree view, you can use the editable cells in the grid view to modify the branch table data. The software automatically saves the modifications you make when you change to another row, select another node in the tree view, or select another command. For more information, see *Branch Table* (on page 394).

Define Cap Screw Length Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Cap Screw Length Calculation Tolerance Rule**.

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Bolt Length From** column, enter the starting bolt length for the tolerance.

5. In the **Bolt Length To** column, enter the ending bolt length for the tolerance.

6. In the **Bolt Diameter From** column, enter the starting bolt diameter for the tolerance.

7. In the **Bolt Diameter To** column, enter the ending bolt diameter for the tolerance.

8. In the **Bolt Length Tolerance** column, enter the positive or negative tolerance to use for the bolt length calculation.

NOTES

- For more information about cap screw length calculation tolerance that you can define, see *Cap Screw Length Calculation Tolerance* (on page 396).

- The **Cap Screw Len Cal Tolerance** sheet in the **Piping Specifcation.xls** workbook corresponds to the **Cap Screw Length Calculation Tolerance Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Clamp Selection Filters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Clamp Selection Filter**.

3. Click **Insert Row** $\exists_{+\varepsilon}$ to insert a blank row in the grid view.

4. Define the clamp selection filter by providing appropriate values in the different columns.

NOTES

- For more information about each clamp selection filter property you can define, see *Clamp Selection Filter* (on page 378).

- The **Clamp Selection Filter** sheet in the **Piping Specification.xls** workbook corresponds to the **Clamp Selection Filter** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Corrosion Allowances

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Corrosion Allowance**.

3. Click **Insert Row** $\exists_{+\varepsilon}$ to insert a blank row in the grid view.

4. In the **Materials Category** column, enter the materials code for which you are defining corrosion allowance.

5. In the **Fluid Code** column, enter the fluid code for which you are defining corrosion allowance.

6. In the **Corrosion Allowance** column, specify the corrosion allowance for the specified material and fluid codes. Be sure to include the units of measurement, **in** or **mm**, when specifying this value.

NOTES

- Valid material codes are defined in the **Material Grade** select list.

- Valid fluid codes are defined in the **Fluid Code** select list.

- For more information about each corrosion allowance property that you can define, refer to *Corrosion Allowance* (on page 396).

- The **Corrosion Allowance** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Corrosion Allowance** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Default Change of Direction Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Default Change of Direction Per Spec Rule**

3. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

4. In the **Bend Angle From** column, type the lower boundary of the bend angle.

5. In the **Bend Angle To** column, type the upper boundary of the bend angle.

6. In the **Functional Short Code** column, type the functional short code to use to access the piping commodity filter for the change-of-direction fitting.

NOTES

-   For more information about default change of direction per spec that you can define, see *Default Change of Direction Per Spec* (on page 397).

-   The **Default Change Of Dir Per Spec** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Default Change of Direction Per Spec Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Exterior Coating and Surface Treatments

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Exterior Coating and Surface Treatment Rule**.

3. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

4. In the **Nominal Piping Diameter From** column, type the nominal pipe diameter (NPD) that specifies the start of the treatment range.

5. In the **Nominal Piping Diameter To** column, type the NPD that specifies the end of the treatment range.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPDs. For example, type **mm** or **in**.

7. In the **Environmental Zone** column, select where the piping is located.

8. In the **Outside Surface Treatment Requirement** column, select the exterior surface treatment requirement that you want to use for the defined NPD range, if needed.

9. In the **Outside Surface Treatment** column, select the exterior surface treatment that you want to use for the defined NPD range, if needed.

10. In the **Coating Requirement** column, select the coating requirement that you want to use for the defined NPD range, if needed.

11. In the **Coating Type** column, select the coating type that you want to use for the defined NPD range, if needed.

12. In the **Auxiliary Treatment Requirement** column, select the auxiliary treatment requirement, if needed.

13. In the **Auxiliary Treatment** column, select the auxiliary treatment, if needed.

📝 NOTES

- For more information about each exterior surface treatment property that you can define, refer to *Exterior Coating and Surface Treatment* (on page 397).

- The **Outside Surface Treatment** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Exterior Coating and Surface Treatment Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Field Fit Length

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Field Fit Length Rule**

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Construction Requirements End 1** column, type the construction requirement codelist value for end 1.

5. In the **Construction Requirements End 2** column, type the construction codelist value for end 2.

6. In the **Field Fit Length** column, type the field fit length to use when computing the cut length of plain piping for the defined weld type, diameter, and construction requirements.

7. In the **Nominal Piping Diameter From** column, type the lower boundary for nominal pipe diameter.

8. In the **Nominal Piping Diameter To** column, type the upper boundary for nominal pipe diameter.

9. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

10. In the **Weld Class** column, enter the weld class for which to define a field fit length.

11. In the **Weld Type** column, enter the weld type code for which to define a field fit length.

📝 NOTES

- For more information about the field fit length you can define, see *Field Fit Length* (on page 398).

- The **Field Fit Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Field Fit Length Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Field Lining Thickness

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Field Lining Thickness Rule**

3. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

4. In the **Nominal Piping Diameter From** column, type the lower boundary for nominal pipe diameter.

5. In the **Nominal Piping Diameter To c**olumn, type the upper boundary for nominal pipe diameter.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

7. In the **Liner Thickness Inside Diameter** column, enter the thickness of the lining material at the inside diameter of field-lined fittings.

8. In the **Liner Thickness on Face of Flange** column, enter the thickness of the lining material at the face of the flange at any field-lined bolted fittings.

NOTES

- For more information about each field lining thickness that you can define, see *Field Lining Thickness* (on page 399).

- The **Field Lining Thickness** sheet in the **Piping Material Class.xls** workbook corresponds to the **Field Lining Thickness Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Flared Pipe Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Flared Pipe Per Spec Rule.**

3. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

4. In the **Spec Name** column, type the name of the piping material class.

5. In the **Nominal Piping Diameter** column, enter the pipe diameter for which the flared pipe information applies.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

7. In the **Schedule Thickness** column, enter the schedule thickness short description or code for the pipe.

8. In the **Lap Length** column, enter the extra length to add to the pipe.

9. In the **Lap Thickness** column, enter the thickness of the flared lip.

📝 **NOTES**

- For more information about each flared pipe per spec that you can define, see *Flared Pipe Per Spec* (on page 400).

- The **Flared Pipe** sheet in the **Piping Specification.xls** workbook corresponds to the **Flared Pipe Per Spec Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Flexible Hose Assembly Information

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Flexible Hose Assembly Rule.**

3. Click **Insert Row** ⊒ₑ to insert a blank row in the grid view.

4. In the **Acceptable Alignment Tolerance End 1** column, enter the maximum angle for mis-alignment at end 1.

5. In the **Acceptable Alignment Tolerance End 2** column, enter the maximum angle for mis-alignment at end 2

6. In the **Flexible Hose Topology Type** column, select whether the flexible hose assembly is a radial, offset, or traveling loop type.

7. In the **Flexible Hose Assembly option** column, select the assembly option.

8. In the **Flexible Hose Assembly option category** column, select the assembly option category.

9. In the **Flexible Hose Assembly Tag** column, select the assembly tag option.

10. In the **Flexible Hose Commodity Option Code** column, select the commodity code for the flexible hose.

11. In the **Maximum Total Length** column, enter the maximum length for flexible hoses in this assembly.

12. In the **Minimum Bend Angle** column, enter the minimum bend angle for flexible hoses in this assembly.

13. In the **Minimum Bend Radius** column, enter the minimum bend radius for the flexible hose assembly.

14. In the **Minimum Bend Tangent Length** column, enter the minimum bend tangent for flexible hoses in this assembly.

15. In the **Nominal Diameter From** column, type the lower bound of the nominal pipe diameter for which the flexible hose assembly applies.

16. In the **Nominal Diameter To** column, type the upper bound of the nominal pipe diameter for which the flexible hose assembly applies.

17. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

18. In the **Round Up Increment Length** column, enter the distance to round up the hose length.

NOTES

- For more information about flexible hose assembly information that you can define, see *Flexible Hose Assembly Rule* (on page 401).

- The **Flexible Hose Assembly Rule** sheet in the **Flexible Hose Assembly Rule Data.xls** workbook corresponds to the **Flexible Hose Assembly Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Gasket Selection Filters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Gasket Selection Filter**.

3. Click **Insert Row** ⅂ₑ to insert a blank row in the grid view.

4. Define the gasket selection filter by providing appropriate values in the different columns.

NOTES

- For more information about each gasket selection filter property that you can define, see *Gasket Selection Filter* (on page 381).

- The **Gasket Selection Filter** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Gasket Selection Filter** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Interior Coating and Surface Treatments

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Interior Coating and Surface Treatment Rule**.

3. Click **Insert Row** ⅂ₑ to insert a blank row in the grid view.

4. In the **Nominal Piping Diameter From** column, type the nominal pipe diameter (NPD) that specifies the start of the treatment range.

5. In the **Nominal Piping Diameter To** column, type the NPD that specifies the end of the treatment range.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPDs. For example, type **mm** or **in**.

7. In the **Interior Surface Treatment** column, select the interior surface treatment that you want to use for the defined NPD range.

8. In the **Coating Type** column, select the coating type that you want to use for the defined NPD range.

NOTES

▪ For more information about each interior surface treatment property that you can define, refer to *Interior Coating and Surface Treatment* (on page 402).

▪ The **Inside Surface Treatment** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Interior Coating and Surface Treatment Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Joint Quality Factors

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Joint Quality Factor**.

3. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

4. In the **Nominal Piping Diameter From** column, type the nominal pipe diameter (NPD) that specifies the start of the joint quality factor range.

5. In the **Nominal Piping Diameter To** column, type the NPD that specifies the end of the joint quality factor range.

6. In the **NPD Unit Type** column, type the units for the NPDs. For example, type **mm** or **in**.

7. In the **Joint Quality Factor** column, type the joint quality factor, as a percentage, that you want to use for the defined NPD range.

NOTES

▪ For more information about each joint quality factors property that you can define, refer to *Joint Quality Factor* (on page 403).

▪ The **Joint Quality Factors** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Joint Quality Factors** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Machine Bolt Length Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Machine Bolt Length Calculation Tolerance Rule**.

3. Click **Insert Row** ⌐ₑ to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, enter the starting bolt diameter for the tolerance.

5. In the **Bolt Diameter To** column, enter the ending bolt diameter for the tolerance.

6. In the **Bolt Length From** column, enter the starting bolt length for the tolerance.

7. In the **Bolt Length To** column, enter the ending bolt length for the tolerance.

8. In the **Bolt Length Tolerance** column, enter the positive or negative tolerance to use for the bolt length calculation.

NOTES

- For more information about bend angles that you can define, see *Machine Bolt Length Calculation Tolerance* (on page 403).

- The **Mach Bolt Len Cal Tolerance** sheet in the **Piping Specification.xls** workbook corresponds to the **Machine Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Mechanical Joint Allowable Pipe End Separation

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Mechanical Joint Allowable Pipe End Separation Rule.**

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Nominal Diameter From** column, define the lower bound of the largest nominal piping diameter for which the end separation applies.

5. In the **Nominal Diameter To** column, define the upper bound of the largest nominal piping diameter for which the end separation applies.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

7. In the **Pipe End Separation** column, type the separation distance.

8. Define the optional properties as needed.

NOTES

- For more information about mechanical joint allowable pipe end separation information that you can define, see *Mechanical Joint Allowable Pipe End Separation Rule* (on page 404).

- The **Mech Joint Allow Pipe End Separation** sheet in the **Piping Specification.xls** workbook corresponds to the **Mechanical Joint Allowable Pipe End Separation Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Minimum Pipe Length Rule for Purchase Length Pipe Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Minimum Pipe Length Rule for Purchase Length Pipe.**

3. Click **Insert Row** ⌐ to insert a blank row in the grid view.

4. In the **Spec Name** column, type the name of the pipe specification for which this minimum pipe length applies.

5. In the **Nominal Piping Diameter** column, type the nominal pipe diameter for which you are defining minimum values.

6. In the **Nominal Piping Diameter Units** column, type the units for the NPD. For example, type **mm** or **in**.

7. In the **Purchase Length** column, specify the purchase length for the piping for which the minimum pipe length applies.

8. In the **Minimum Pipe Length** column, type the minimum pipe length that you will allow for the specified NPD.

9. In the **Preferred Minimum Pipe Length** column, type your preferred minimum pipe length for the specified NPD.

NOTES

- For more information about each minimum pipe length purchase property that you can define, see *Minimum Pipe Length Rule for Purchase Length Pipe Per Spec* (on page 405).

- The **Min Pipe Len Purchase Per Spec** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Minimum Pipe Length Rule for Purchase Length Pipe per Spec** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Length Rule for Random Length Pipe Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Minimum Pipe Length Rule for Random Length Pipe.**

3. Click **Insert Row** ⌐ to insert a blank row in the grid view.

4. In the **Spec Name** column, type the name of the piping materials class for which you want to define the minimum component data.

5. In the **NPD** column, type the nominal pipe diameter for which you are defining minimum values.

6. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

7. In the **Minimum Pipe Length** column, type the minimum pipe length that you will allow for the specified NPD.

8. In the **Preferred Minimum Pipe Length** column, type your preferred minimum pipe length for the specified NPD.

📝 **NOTES**

- For more information about each minimum pipe length purchase property that you can define, see *Minimum Pipe Length Rule for Random Length Pipe Per Spec* (on page 406).

- The **Min Pipe Len Rule Per Spec** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Minimum Pipe Length Rule for Random Length Pipe per Spec** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bending Elongation Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Pipe Bending Elongation Rule**.

3. Click **Insert Row** ⃗ᴇ to insert a blank row in the grid view.

4. In the **Nominal Pipe Diameter** column, enter the pipe diameter for which the information applies.

5. Define the pipe elongation values.

6. In the **Spec Name** column, type the name of the piping materials class for which you want to define the pipe bending elongation information.

📝 **NOTES**

- For more information about each field fit length property that you can define, see *Pipe Bending Elongation Per Spec* (on page 408).

- The **Pipe Bending ElongationPer Spec** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Pipe Bending Elongation Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Branch Fabrication Rule

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes >** <Piping Materials Class Name> **> Piping Material Class Rules**

2. Click **Insert Row** ⃗ᴇ to insert a blank row in the grid view.

3. In the **Header Size** column, enter the nominal piping diameter (NPD) for the reinforced branch header.

4. In the **Header Size Units** column, select **in** (inches) as the system of units for the header size.

5. In the **Branch Size** column, enter the nominal piping diameter for the reinforced branch.

6. In the **Branch Size Units** column, select **in** (inches) as the system of units for the branch size.

7. Set the other options as required.

8. Click **Save** 💾.

📝 **NOTES**

- The **PipeBranchFabricationRule** sheet in the **Sample Data For Implied Pipe Stock.xls** workbook corresponds to the **Pipe Branch Fabrication Rule** node. You must bulkload this workbook to see this node in the **Catalog** task.

- For more information about each property that you can define, see *Pipe Branch Fabrication Rule* (on page 409).

Define Preferred Cap Screw Length

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Preferred Cap Screw Length Rule**.

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

6. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

7. In the **Materials Grade** column, type the material grade code for the bolt.

8. Define the preferred bolt length information in the remaining columns.

📝 **NOTES**

- Valid material grade codes are listed in the **Materials Grade** select list.

- For more information about each preferred cap screw length property that you can define, see *Preferred Cap Screw Length* (on page 413).

- The **Preferred Cap Screw Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Cap Screw Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Machine Bolt Length

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Preferred Machine Bolt Length Rule**.

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

6. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

7. In the **Materials Grade** column, type the material grade code for the bolt.

8. Define the preferred bolt length information in the remaining columns.

NOTES

- Valid material grade codes are listed in the **Materials Grade** select list.

- For more information about each preferred machine bolt length property that you can define, see *Preferred Machine Bolt Length* (on page 414).

- The **Preferred Machine Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Machine Bolt Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Stud Bolt Length

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Preferred Stud Bolt Length Rule**.

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

5. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the preferred bolt length.

6. In the **Bolt Diameter Increment** column, type the value by which to increment the bolt diameter.

7. In the **Materials Grade** column, type the material grade code for the bolt.

8. Define the preferred bolt length information in the remaining columns.

NOTES

- Valid material grade codes are listed in the **Materials Grade** select list.

- For more information about preferred stud bolt length property that you can define, see *Preferred Stud Bolt Length* (on page 415).

- The **Preferred Stud Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the **Preferred Stud Bolt Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Preferred Tap End Stud Bolt Length

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Preferred Tap End Stud Bolt Length Rule**.

3. Click **Insert Row** ⌐ᵤ to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, enter the bolt diameter lower bounds for which to specify a preferred length.

5. In the **Bolt Diameter** column, enter the bolt diameter upper bounds for which to specify a preferred length.

6. In the **Bolt Diameter Increment** column, enter the value by which to increment the bolt diameter.

7. In the **Material Grade** column, enter the material grade code for the bolt.

8. In the **Preferred Bolt Length From** column, enter the preferred bolt length lower bound for this bolt diameter and material grade.

9. In the **Preferred Bolt Length To** column, enter the preferred bolt length upper bound for this bolt diameter and material grade.

10. In the **Preferred Bolt Length Increment** column, enter the value by which to increment the preferred bolt length.

11. Click **Save** 🖫.

NOTES

- For more information about the preferred tap end stud bolt length that you can define, see *Preferred Tap End Stud Bolt Length Rule* (on page 416).

- The **Preferred Tap End Stud Bolt Length** sheet in the **Piping Specification.xls** workbook corresponds to the   **Preferred Tap End Stud Bolt Length Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Nut Selection Filters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Nut Selection Filter**.

3. Click **Insert Row** ⌐ᵤ to insert a blank row in the grid view.

4. Define the nut selection filter by providing appropriate values in the different columns.

NOTES

- For more information about each nut selection filter property that you can define, see *Nut Selection Filter* (on page 384).

- The Nut Selection Filter sheet in the **Piping Materials Class.xls** workbook corresponds to the **Nut Selection Filter** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide, avail*able with the **Help > Printable Guides** command in the software.

Define Allowable Nominal Piping Diameters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Permissible Nominal Piping Diameters Rule**.

3. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

4. In the **Nominal Diameter** column, type the nominal piping diameters that you want to define in your piping materials class.

5. In the **Unit Type** column, type the units for your NPD. For example, type **mm** or **in**.

NOTES

- For more information about each permissible nominal piping diameter property that you can define, refer to *Permissible Nominal Piping Diameters Rule* (on page 406).

- The **Pipe Nominal Diameters** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Permissible Nominal Piping Diameters Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Permissible Taps

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Permissible Taps**.

3. Click **Insert Row** ⌐⌐ to insert a blank row in the grid view.

4. In the **Permissible Tap Number** column, enter the tap number that you want to allow in the piping materials class.

5. In the **Is Preferred Tap** column, enter **TRUE** if the tap number is the preferred tap. Enter **FALSE** if the tap is not the preferred tap.

NOTES

- The tap numbers must be defined using *Tap Properties* (on page 502).

- For more information about each permissible tap property that you can define, refer to *Permissible Taps* (on page 407).

- The **Permissible Taps** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Permissible Taps** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Port Alignment Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Port Alignment Rule**.

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. In the **Acceptable Alignment Tolerance** column, specify the maximum angular variation between the branch centerline and the header centerline.

5. In the **End Preparation** column, type the end preparation code for the port alignment.

6. In the **Method of Trimming** column, enter the code for the method of trimming.

7. Define the nominal piping diameter range for the port alignment that you are defining.

8. In the **Spec Name** column, specify the Piping Materials Class for which the port alignment exception is intended.

NOTES

- For more information about port alignment property that you can define, see *Port Alignment Per Spec* (on page 412).

- The **Port Alignment Per Spec** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Port Alignment Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Permissible Pipe Bending Machine Information

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Permissible Pipe Bending Machine Rule.**

3. Click **Insert Row** ⧉ to insert a blank row in the grid view.

4. In the **Nominal Diameter From** column, type the lower bound of piping diameter for which pipe bending machine applies.

5. In the **Nominal Diameter To** column, type the upper bound of piping diameter for which pipe bending machine applies.

6. In the **Nominal Piping Diameter UOM** column, enter the units of measurement.

7. In the **Pipe Bending Machine Name** column, type the bending machine code that you want to allow in the piping material class.

NOTES

- For more information about port alignment property that you can define, see *Permissible Pipe Bending Machine* (on page 407).

- The **Permissible Pipe Bending Machine** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Permissible Pipe Bending Machine Rule** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Reinforcing Pad Widths

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Reinforcing Pad Data**.

3. Click **Insert Row** ⌐⊏ to insert a blank row in the grid view.

4. In the **Header Size** column, specify the header size for the pad width that you are defining.

5. In the **Branch Size** column, specify the branch size for the pad width that you are defining.

6. Define the angle range for the pad width that you are defining.

7. In the **Minimum Reinforcing Pad Width** column, enter the minimum reinforcing pad width.

⊟ NOTES

- For more information about each reinforcing pad data property that you can define, refer to *Reinforcing Pad Data* (on page 417).

- The **Reinforcing Pad Data** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Reinforcing Pad Data** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Reinforcing Weld Size

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Reinforcing Weld Data**.

3. Click **Insert Row** ⌐⊏ to insert a blank row in the grid view.

4. In the **Header Size** column, specify the header size for the weld size that you are defining.

5. In the **Branch Size** column, specify the branch size for the weld size that you are defining.

6. Define the angle range for the weld size that you are defining.

7. In the **Minimum Reinforcing Weld Size** column, enter the minimum reinforcing pad width.

⊟ NOTES

- For more information about each reinforcing weld size property that you can define, refer to *Reinforcing Weld Data* (on page 418).

- The **Reinforcing Weld Data** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Reinforcing Weld Data** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Root Gaps Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Root Gap Rule**.

3. Click **Insert Row** ⤵ to insert a blank row in the grid view.

4. Enter the bottom and top size range for the rule.

5. Enter the root gap to use.

📝 NOTES

- The piping materials class must be defined in the *Piping Materials Class Data* (on page 390) node.

- The **Root Gap Rule** node in the **Catalog** task defines the same rules as does the **Root Gap Rule Per Spec** sheet in the **Piping Materials Class.xls** workbook. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Service Limits

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Service Limits Rule**.

3. Click **Insert Row** ⤵ to insert a blank row in the grid view.

4. In the **Temperature** column, type the temperature service limit.

5. In the **Pressure** column, type the corresponding pressure service limit.

📝 NOTES

- For more information about each service limit property that you can define, refer to *Service Limits* (on page 419).

- The **Service Limits** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Service Limits Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Define Size Reduction Per Spec

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Size Reduction Rule Per Spec**.

3. Click **Insert Row** ⁼⁺ₑ to insert a blank row in the grid view.

4. Select the reduction type (concentric or eccentric).

5. Enter the first and second sizes for the size reduction rule.

6. Enter the second fitting's first size.

7. Optionally, enter the third and fourth fittings' first size.

8. Optionally, enter the size reduction preference order.

NOTES

- The piping materials class must be defined in the **Piping Materials Class Data** node.

- For more information about each size reduction per spec property that you can define, see *Size Reduction Per Spec* (on page 420).

- The **Size Reduction Rule Per Spec** node in the **Catalog** task defines the same rules as does the **Size Reduction Per Spec** rule sheet in the **Piping Materials Class.xls** workbook. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Stud Bolt Length Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Stud Bolt Length Calculation Tolerance Rule**.

3. Click **Insert Row** ⁼⁺ₑ to insert a blank row in the grid view.

4. In the **Bolt Length From** column, specify the beginning bolt length for the range of bolt lengths that are to use the specified tolerance.

5. In the **Bolt Length To** column, specify the ending bolt length for the range of bolt lengths that are to use the specified tolerance.

6. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the range of bolt diameters that are to use the specified tolerance.

7. In the **Bolt Diameter To** column, specify the ending bolt diameter for the range of bolt diameters that are to use the specified tolerance.

8. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

NOTES

- For more information about each stud bolt calculation tolerance property that you can define, see *Stud Bolt Length Calculation Tolerance* (on page 421).

- The **Stud Bolt Len Cal Tolerance** sheet in in the **Piping Specification.xls** workbook corresponds to the **Stud Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Tap End Stud Bolt Length Calculation Tolerance

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Tap End Stud Bolt Length Calculation Tolerance Rule**.

3. Click **Insert Row** ⅂← to insert a blank row in the grid view.

4. In the **Bolt Diameter From** column, specify the beginning bolt diameter for the tolerance that you want to define.

5. In the **Bolt Diameter To** column, specify the ending bolt diameter for the tolerance that you want to define.

6. In the **Bolt Length From** column, specify the beginning bolt length for the tolerance that you want to define.

7. In the **Bolt Length To** column, specify the ending bolt length for the tolerance that you want to define.

8. In the **Bolt Length Tolerance** column, enter the tolerance the software is to use for length calculations for the bolt length and bolt diameter range that you defined.

▤ NOTES

- For more information about each tap end stud bolt calculation tolerance property that you can define, see *Tap End Stud Bolt Calculation Tolerance Rule* (on page 422).

- The **Tap End Stud Bolt Len Cal Tol** sheet in the **Piping Specification.xls** workbook corresponds to the **Tap End Stud Bolt Length Calculation Tolerance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Takedown Parts

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Pipe Takedown Parts Rule**.

3. Click **Insert Row** ⅂← to insert a blank row in the grid view.

4. In the **Take Down Short Code** column, type the short code to use for this NPD if the user selects the **Takedown** option when placing a split.

5. In the **Weld Short Code** column, type the short code to use for this NPD if the user selects the **Weld** option when placing a split.

6. In the **Pair Required** column, define whether a pair is required. For example, flanges are used in pairs so you would set this column to **Yes**. Unions are not used in pairs so you would set this column to **No**.

7. In the **NPD** column, type the NPD for which you are defining minimum values.

8. In the **NPD Unit Type** column, type the units for the NPD. For example, type **mm** or **in**.

9. In the **Is Weld** column, select **Yes** if the split or takedown joint is welded. Select **No** if it is not.

10. Click **Save** 💾.

NOTES

- The selected short code is passed to the *Piping Commodity Filter* (on page 385) and is used to help select the commodity code.

- The **Pipe Takedown Parts** sheet in the **Piping Specification.xls** workbook corresponds to the **Pipe Takedown Parts Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Thickness Data

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Thickness Data Rule**.

3. Click **Insert Row** ⅂← to insert a blank row in the grid view.

4. Define the thickness data rules by providing appropriate values in the different columns.

NOTES

- For more information about each thickness data property that you can define, see *Thickness Data Rule* (on page 422).

- The **Thickness Data Rule** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Thickness Data Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Washer Selection Filters

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Washer Selection Filter**.

3. Click **Insert Row** ⅂← to insert a blank row in the grid view.

4. Define the washer selection filter by providing appropriate values in the different columns.

NOTES

- For more information about washer selection filter property that you can define, see *Washer Selection Filter* (on page 425).

- The **Washer Selection Filter** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Washer Selection Filter** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Weld Clearance

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Weld Clearance Rule**.

3. Click **Insert Row** ⅃◄ to insert a blank row in the grid view.

4. Define the weld clearance parameters.

NOTES

- For more information about each weld clearance property that you can define, see *Weld Clearance Rule* (on page 424).

- The **Weld Clearance Rule** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Weld Clearance Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Weld Gap

1. In the tree view, click **Piping > Piping Specification > Piping Materials Classes**.

2. In the **Piping Materials Classes** branch, open a specification and click **Piping Materials Class Rules > Weld Gap Rule**.

3. Click **Insert Row** ⅃◄ to insert a blank row in the grid view.

4. In the **Weld Type** column, type the weld type code.

5. Define the NPD range for the weld gap.

6. In the **Weld Gap** column, type the gap between the welded ends of the welded joint. Be sure to include the units when defining this value, for example, **3mm**.

NOTES

- For more information about each weld gap property that you can define, see *Weld Gap Rule* (on page 425).

- Valid weld type codes are listed in the **Weld Type** select list.

- The **Weld Gap Rule** sheet in the **Piping Materials Class.xls** workbook corresponds to the **Weld Gap Rule** node. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Pipe Bending Data

The software can check pipe bends as they are modeled to ensure that they have adequate lengths for fabrication on an allocated bending machine. The bending manufacturability rules define the bending machine for the material class, the nominal size, the type of bend. You also define the grip, pull, and bend-to-bend lengths based on the bending machine, material, NPD, and pipe wall thickness. You should customize the rules based on what makes sense for your company.

The pipe bending manufacturability rules are delivered in the **Pipe Bending Manufacturability Rules.xls** workbook in the *[Product Folder]*\CatalogData\BulkLoad\SampleDataFiles folder on your server. You must bulk load the workbook.

What do you want to do?

- *Define Pipe Bending Machines* (on page 200)
- *Define Pipe Bending Die Data* (on page 201)
- *Define Pipe Bending Minimum Tangent Length Data* (on page 202)
- *Define Pipe Bending Configuration Data* (on page 202)

Define Pipe Bending Machines

1. In the tree view, click **Piping > Pipe Bending Data**.

2. In the **Pipe Bending Data** branch, open the **Pipe Bending Machine Data** node.

3. Click **Insert Row** ⅉ to insert a blank row in the grid view.

4. In the **Pipe Bending Machine Name** column, enter a unique number to identify the bending machine.

5. In the **Pipe Bending Machine Description** column, enter the make, model, and other descriptive information about the bending machine.

6. In the **Pipe Bending Machine Type** column, enter the select list value that corresponds to the type of bending machine. Valid select list values are listed in the **Pipe Bending Machine Type** select list.

7. In the **Height Above Shop Floor** column, enter the distance between the shop floor and the location on the bending machine where the pipes are bent.

8. In the **Maximum Pipe Length** column, enter the maximum pipe length that the bending machine can process.

9. In the **Maximum Number of Bends** column, enter the maximum number of bends that the bending machine can process.

10. In the **Maximum Bend Angle** column, enter the maximum bend angle that the bending machine can produce.

11. In the **Minimum Bend Angle** column, enter the minimum bend angle that the bending machine can produce.

12. In the **Maximum Capacity** column, enter the maximum outside pipe diameter that the bending machine can accept.

13. In the **Maximum Section Modulus** column, enter the maximum section modulus that the bending machine can process.

14. In the **Maximum Centerline Radius** column, enter the maximum centerline radius that the bending machine can produce.

NOTES

- For more information about the properties that you can define, refer to *Pipe Bending Machine Data* (on page 333).

- The **Pipe Bending Machine Data** sheet in the **Pipe Bending Manufacturability Rules.xls** workbook corresponds to the **Pipe Bending Machine Data** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bending Die Data

1. In the tree view, click **Piping > Pipe Bending Data**.

2. In the **Pipe Bending Data** branch, open the **Pipe Bending Die Data** node.

3. Click **Insert Row** to insert a blank row in the grid view.

4. In the **Pipe Bending Machine Name** column, enter the bending machine identification number. This number is defined on the **Pipe Bending Machine Data** sheet.

5. Define the NPD for the die.

6. Define the pipe bend radius multiplier for the die.

7. Define the minimum pull, grip, and tangent lengths.

NOTES

- For more information about the properties that you can define, refer to *Pipe Bending Die Data* (on page 332).

- The **Pipe Bending Die Data** sheet in the **Pipe Bending Manufacturability Rules.xls** workbook corresponds to the **Pipe Bending Die Data** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bending Minimum Tangent Length Data

1. In the tree view, click **Piping > Pipe Bending Data**.

2. In the **Pipe Bending Data** branch, open the **Pipe Bending Minimum Tangent Length Data** node.

3. Click **Insert Row** ⧄ to insert a blank row in the grid view.

4. In the **Pipe Bending Machine Name** column, enter the bending machine code for which you want to define minimum tangent length data. This number is defined on the **Pipe Bending Machine Data** sheet.

5. In the **Pipe Bend Type** column, select the pipe bend type for which you want to define minimum tangent length data.

6. Define the minimum tangent length information between the turns and other optional information.

NOTES

- For more information about the properties that you can define, see *Pipe Bending Minimum Tangent Length Data Sheet* (on page 334).

- The **Pipe Bending Min Tangent Len Data** sheet in the **Pipe Bending Manufacturability Rules.xls** workbook corresponds to the **Pipe Bending Minimum Tangent Length Data** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Define Pipe Bending Configuration Data

1. In the tree view, click **Piping > Pipe Bending Data**.

2. In the **Pipe Bending Data** branch, open the **Pipe Bending Configuration Data** node.

3. Click **Insert Row** ⧄ to insert a blank row in the grid view.

4. Define the Nominal Bend Angles and NonPlanar Rotation Angles for the pipe bend configuration.

NOTES

- For more information about the properties that you can define, see *Pipe Bending Configuration Data* (on page 337).

- The **Pipe Bending Configuration Data** sheet in the **Pipe Bending Manufacturability Rules.xls** workbook corresponds to the **Pipe Bending Configuration Data** node in the **Catalog** task. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

# Consistency between Piping Specification and Catalog Data

Piping design systems are typically driven by design specifications that identify such items as piping material, flange pressure rating, pipe schedule, branch connection types, and so forth.

Although certain aspects of specifications are somewhat standard in a given industry, specifications vary greatly from industry to industry and from company to company within an industry. As such, the piping specification writer must have an environment that not only verifies that the piping commodities, piping specialties, and instruments in the Piping specification for a model are consistent with the data in the Catalog, but also that the required components can be created in the 3D model.

Using the commands and options that are available in the **Catalog** task, there are several types of data verification that the software can perform:

- **Uniqueness** - The software automatically checks for uniqueness when you enter a new row of data into the editable grid.

- **Data Entry Validation** - When you enter data into the editable grid, the software ensures that the entries are valid and that you have entered all the required data before saving the data to the Catalog database.

- **Rule and Integrity Validation** - Commands like **Verify Consistency Report** and **Check Data** are available to provide more cross-table verification.

The **Verify Consistency Report** command, available from the **Tools** menu in the **Catalog** task, provides a specification writer with the means to determine whether or not the Catalog data required by the Piping specification does exist. For example, if a specification writer adds a valve to the Piping specification, the **Verify Consistency Report** command can be used to verify that the appropriate flanges, bolts, and gaskets are also available in that piping materials class. The command is also able to determine duplicate entries in the Piping Commodity Filter based on short code, first size (range), second size (range), commodity option, multi-size option, and maximum and minimum temperatures.

After the consistency check is complete, a report detailing the discrepancies discovered is generated and delivered to a user-specified location.

You can use the **Check Data** command to check data real-time as it is entered into the editable grid. For example, when you enter data in the piping commodity filter, you can use the **Check Data** command to interactively verify the relationships of that data against other data in the Catalog database, such as in the material control data table.

NOTE The **Options** dialog box provides additional means for ensuring data verification. For more information, see *Piping Specifications Tab (Options Dialog Box)* (on page 974).

See Also
Check Data Command (on page 208)
Piping Specifications Tab (Options Dialog Box) (on page 974)
Verify Consistency Report Command (on page 204)
Verifying Consistency Between Piping Specifications and Catalog Data (on page 208)

Verify Consistency Report Command

Compares piping specifications to Catalog data and verify whether the piping commodities in the piping specification for a model are consistent with the data in the Catalog so that the required components can be created in the model. The results of the consistency check can be reviewed via a Microsoft Excel report that is generated and delivered to a user-defined location.

★ **IMPORTANT** Before using this command, verify that your Microsoft Excel Trust Center Macro Settings is set to "Enable all macros". In addition, you must select the "Trust access to the VBA project object model" option.

This command checks the following:

- Bolt extension rule data is undefined

- Reports bolt parts

- Bolt is not defined in the bolt part data

- Bolt type is not defined in the bolt part data

- Bolted end properties are inconsistent with the bolt selection filter

- Bolt is not defined in the piping commodity material control data

- Duplicate entries or overlapping NPD ranges in the bolt selection filter

- Bolt for bolted joint required by the piping materials class is not defined in the bolt selection filter

- Substitution cap screw is not defined in the bolt part data

- Summary of catalog parts required by each piping materials class

- Clamp is not defined in the piping commodity material control data

- Report of clamp commodity symbols

- Clamp symbol is not defined in the piping commodity class data

- Clamp is not defined in the piping commodity service limits data

- Clamp is not defined in the gasket selection filter data

- Report of clamp parts

- Clamp is not defined in the piping commodity class data

- Clamp is not defined in the piping commodity part data

- Duplicate entries or overlapping NPD ranges in the clamp selection filter

- Bolted end generic data is not defined

- Female generic data is not defined

- Liner thickness data is not defined

- Mechanical end generic data is not defined

- Plain piping generic data is not defined

- Summary of commodity class symbols

- Symbol is not defined in the piping commodity class data

- Nominal piping diameter values used to define the first size range, second size range, multi-size option of the piping commodity filter are not available in the permissible nominal piping diameters rule. This also contains the report where the second size to value is greater than or equal to the first size to value, and the second size from value is greater than the first size from value in piping commodity filter.

- Duplicate entries and overlapped size ranges in the piping commodity filter

- Label associated with the short, localized, long material description is not defined

- Component type is not defined in the piping commodity part data

- Piping commodity is not defined in the piping commodity class data

- Piping commodity is not defined in the piping commodity service limits data

- Piping commodity is not defined in the piping commodity material control data

- Flange setback distance rule is not defined

- Report of gasket parts

- Gasket is not defined in the gasket part data

- Gasket is not defined in the piping commodity material control data

- Gasket for a bolted joint required by the piping materials class data is not defined in the gasket selection filter

- Gasket thickness is not defined in the gasket part data

- Gasket procurement thickness is not defined in the gasket part data

- Bolted end properties are inconsistent in the gasket selection filter

- Fluid code is inconsistent in the gasket selection filter

- Duplicate entries or overlapping NPD ranges defined in the gasket selection filter

- Substitution cap screw is not defined in the piping commodity material control data

- Localized material description is not defined in the piping commodity material control data

- Long material description is not defined in the piping commodity material control data

- Multi-port valve operator data is not defined in the industry commodity code for the valve

- Reportable piping commodity is not defined in the piping commodity material control data

- Short material description is not defined in the piping commodity material control data

- Valve operator is not defined in the valve operator material control data

- Valve operator is not defined in the valve operator part data

- Piping commodity, requiring the piping commodity material control data to be based on size, also has a record not based on size

- Report of nut parts

- Nut height is not defined for the nut part

- Supplementary nut height is not defined for the nut part

- Nut is not defined in the piping commodity material control data

- Nut is not defined in the nut part data

- Supplementary nut is not defined in the nut selection filter

- Duplicate entries in the nut selection filter

- Nut for a bolted joint as required by the piping materials class is not defined in the nut selection filter

- Piping commodity is not defined in the piping commodity part data

- Report of the part data in the catalog

- Report of rules in which data is not defined

- Summary of clamp parts

- Summary of bolt parts required by each piping materials class

- Summary of gasket parts required by each piping materials class

- Summary of nut parts required by each piping materials class

- Summary of washer parts

- Symbol placements that failed

- Taps specified by the permissible taps rule that are not defined in the tap property data

- Short material description is not defined in the valve operator material control data

- Long material description is not defined in the valve operator material control data

- Report of washer parts

- Supplementary washer thickness is not defined in the washer part

- Washer thickness is not defined in the washer part

- Washer is not defined in the piping commodity material control data

- Duplicate entries in the washer selection filter

- Washer is not defined in the washer part data

- Washer for bolted joint as required by the piping materials class is not defined in the washer selection filter

- Weight data is not defined for clamp parts

- Weight data is not defined for the piping commodity

- Weld type value is not defined in the weld type rule

- Localized material description is not defined in the valve operator material control data

- Branch fitting specified by the branch intersection rule is not defined in the piping commodity filter

- Reinforcing weld or a reinforcing pad is defined with an incorrect value for the selection basis property in the piping commodity filter

- Service limit is not defined in the service limit rule

- Joint quality factor rule is not defined for the pipe stock that require wall thickness calculations

- Weld data in the weld clearance rule is not defined for each valid combination of NPD values and weld class values

- Takedown fitting shortcode specified by the pipe takedown parts rule is not defined in the piping commodity filter

- Bolt selection filter for nozzles is not defined in the piping commodity material control data

- Bolt selection filter for nozzles is not defined in the bolt part data

- Duplicate entries in the bolt selection filter for nozzles

- Gasket selection filter for nozzles is not defined in the piping commodity material control data

- Gasket for bolted joint is not defined in the gasket selection filter for nozzles

- Duplicate entries in the gasket selection filter for nozzles

- Duplicate entries in the plain piping generic data

- Duplicate entries in the female generic data

- Duplicate entries in the bolted generic data

- Duplicate entries in the mechanical generic data

- Duplicate entries in the liner thickness data

What do you want to do?

- *Verify Consistency Between Piping Specification and Catalog Dialog Box* (on page 207)
- *Verifying Consistency Between Piping Specifications and Catalog Data* (on page 208)

Verify Consistency between Piping Specification and Catalog Dialog Box

Sets options for verifying the piping materials classes, instruments, and specialties that are defined in the Catalog database.

Select the types of objects to verify

Allows you to specify what you want to verify during the consistency check. You can select more than one object type to verify.

Available piping materials classes/Selected piping materials classes

Allows you to specify which piping materials classes you want to include in the consistency check. When you select **Piping materials classes** as an object type to verify, the **Available piping materials classes** column displays the piping materials classes currently defined in the reference data. The **Selected piping materials classes** column displays which classes will be included in the consistency check You use the **Add** and **Remove** buttons to shuffle the classes between the two columns. This option is only available when you select **Piping materials classes** as an option for validation.

Additional validation options

Allows you to expand the validation options to include verifying the existence of weight data, validating long/localized material descriptions, and verifying symbol placement. You can select one or multiple options.

Location of the output report file

Specify the path of the output report file. You can click **Browse** [---] to navigate to a specific location.

Verifying Consistency between Piping Specifications and Catalog Data

1. In the **Catalog** task, click **Tools > Verify Consistency Report**.

2. In the **Verify Consistency between Piping Specification and Catalog** dialog box, use the **Select the types of objects to verify** section to specify what you want to validate. You can click any number of options.

3. If you select **Piping materials classes** as an option to validate, use the **Add** and **Remove** buttons to specify which of the available piping material classes you want to include.

4. In the **Location of the output report file** box, enter the complete path for the report file. The output report displays the results of the consistency check.

Check Data Command

Interactively verifies the relationships between the data you enter into the editable grid against other data in the Catalog database. The command is enabled after you begin entering or modifying data in the editable grid. During processing, the software queries the Catalog database and creates a list of inconsistencies. After processing completes, the **Check Data** dialog box appears and displays the results of the data check. You can then resolve any data inconsistencies or mark an inconsistency to be ignored as a false-positive.

Check Data Dialog Box

Displays the inconsistencies the software finds during the **Check Data** process.
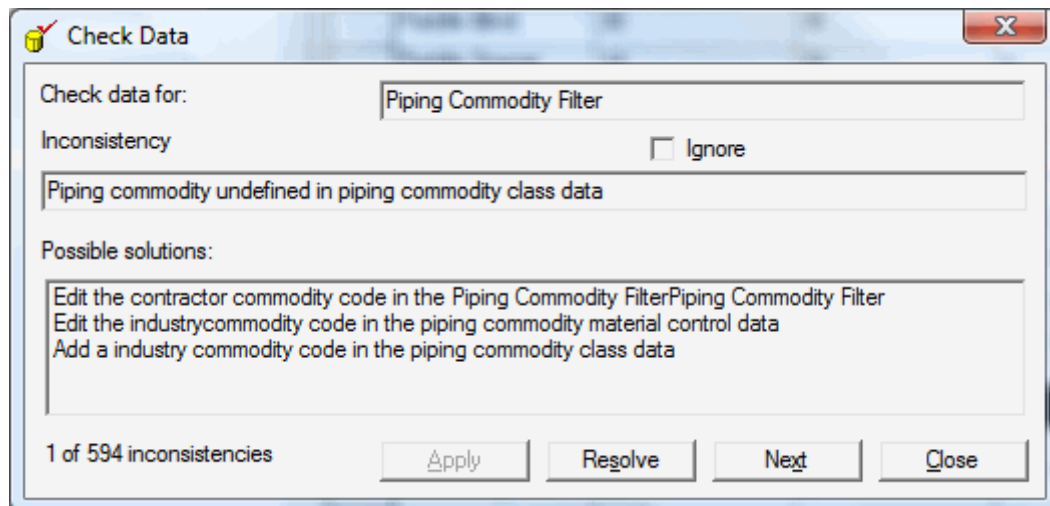
Check data for

Displays the name of the grid to be checked. This name corresponds to the node in the tree that you select to edit a particular grid. If you select a piping specification in the tree view,

this box displays the name of the specification that will be checked for missing or incomplete information.

Inconsistency

Displays the inconsistency that needs to be resolved in the selected row in the editable grid. For example, if the selected piping specification is incomplete, a possible inconsistency is "Missing values for the permissible short code rule."

Ignore

Select this box to ignore the inconsistency as a false-positive. If needed, you can restore an inconsistency that has been marked ignore by using the **Check Data Ignored Inconsistencies** command.

Possible solutions

Displays a list of actions that you can take to resolve the inconsistency.

Apply

Marks the current inconsistency as ignored. This command is only available when you have selected the **Ignore** checkbox.

Resolve

Can take several actions depending on what you select in the **Possible solutions** list. For example, if the selected solution requires an edit, clicking **Resolve** takes you to the appropriate grid, highlights the row that needs to be edited, and puts the focus in the cell. If the selected solution requires that something be added, clicking **Resolve** takes you to the appropriate grid and inserts a new row. This button is only enabled when you select a solution from the **Possible solutions** list.

Next

Refreshes the **Check Data** dialog box with the next inconsistency in the **Check data for** table. The appropriate row in the editable grid is highlighted, and the possible solutions for the current inconsistency appear in the list box for selection. You can click **Next** at any time without resolving the current inconsistency, and the software will continue to the next inconsistency (moving through inconsistencies sequentially, top to bottom). After the software cycles through all the inconsistencies, a message displays asking if you want to check the inconsistencies again.

If you click **Yes**, the software queries the Catalog database and refreshes the inconsistency list. Inconsistencies that have been resolved or ignored are removed from the list; new inconsistencies that have been introduced, as well as those inconsistencies that were skipped previously, are displayed in the dialog box. If you click **No**, the dialog box closes and you are returned to the catalog.

Close

Closes the **Check Data** dialog box. You can click **Close** at any time without resolving all the inconsistencies that exist for the selected grid. Unresolved inconsistencies are not stored in the Catalog database; they are regenerated each time you run the **Check Data** command.

Checking Catalog Data

You can only use the **Check Data** command to check the consistency of your piping reference data against the various rules and specifications that currently exist in the Catalog database. The **Check Data** command is only enabled after you modify data in the editable grid.

1. After making some modifications to the piping specification data in the editable grid, click **Check Data** . (You can also click **Tools > Check Data**.) The software analyzes the data in the active grid, compares it against the Catalog database, and displays the results in the **Check Data** dialog box.

2. In the **Check Data** dialog box, review the inconsistency listed in the **Inconsistency** box. In the editable grid, the row where the specified inconsistency appears is highlighted. If no inconsistencies are found, an informational message is displayed instead.

3. In the **Possible solutions** list, select the solution that will resolve the inconsistency.

   -OR-

   Select the **Ignore** checkbox, and then click **Apply** to ignore the inconsistency as a false-positive. Skip to step 5.

4. Click **Resolve**. The software takes you to the appropriate location in the grid so that you can add or edit the data as needed.

   ★ IMPORTANT After entering new or modifying existing data in the grid, any validation of uniqueness occurs, and if there are errors, you must correct them before proceeding to the next step.

5. In the **Check Data** dialog box, click **Next**.

   *The **Inconsistency** box displays the next inconsistency, the row in the editable grid where the inconsistency appears is highlighted, and the **Possible solutions** list box updates with alternative resolutions.*

6. Repeat steps 3 through 5.

   After you have stepped through all the inconsistencies, the software displays a message asking if you want to check for inconsistencies again.

7. If you click **No**, the **Check Data** command ends. If you click **Yes**, the software queries the Catalog database for inconsistencies again.

📑 NOTES

- If you are in the middle of a new or modified row, the software commits that row to the Catalog database before running the **Check Data** process.

- You can click **Next** at any time to cycle through to the next inconsistency without resolving the current one.

- You can click **Close** at any time without resolving all the inconsistencies that exist for the selected grid. Unresolved inconsistencies are not stored in the Catalog database; they are regenerated each time you run the **Check Data** command.

Ignored Inconsistencies Command

Displays any ignored inconsistencies for the selected node. You can then choose to restore a previously ignored inconsistency so that it can be resolved.

Ignored Inconsistencies Dialog Box

Displays any ignored inconsistencies for the selected node.
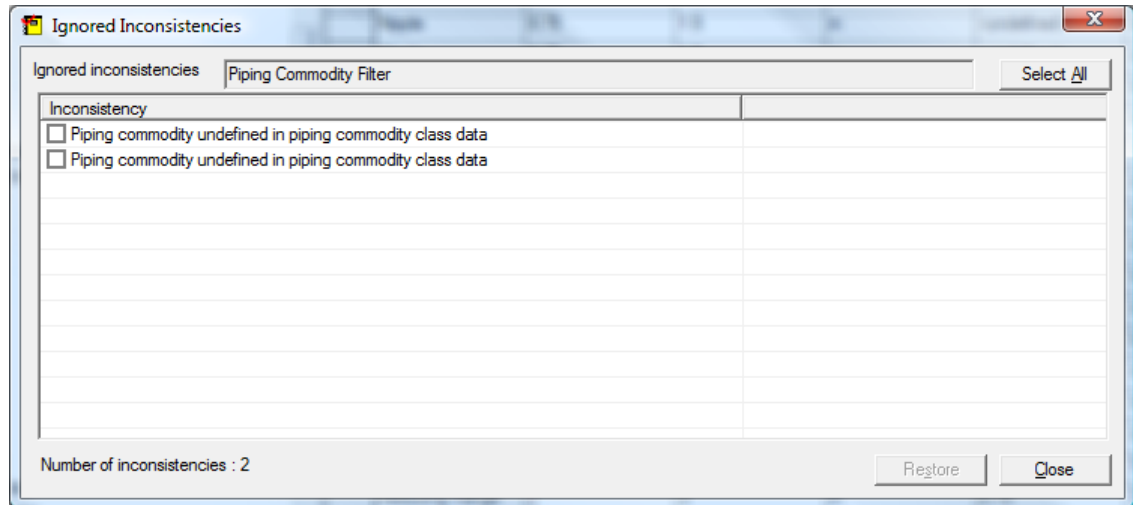
Ignored inconsistencies

Displays the catalog node name whose inconsistencies you are viewing.

Select All

Selects all the inconsistencies listed in the dialog box.

Inconsistency

Lists the inconsistencies that have been ignored for the selected node.

Number of inconsistencies

Displays how many inconsistencies have been ignored for this catalog node.

Restore

Restores, un-ignores, the selected inconsistencies so that they can be resolved using the **Check Data** command.

Close

Exits the command and closes the dialog box.

Restore ignored inconsistencies

1. Select the node in the catalog where you want to restore ignored inconsistencies.

2. Click **Tools > Ignored Inconsistencies**, or select 🔲 on the ribbon.

   The Ignored Inconsistencies dialog box appears. If there are no ignored inconsistencies for the node, a message box appears stating that.

3. Select which inconsistencies to restore from the list.

   -OR-

   Click **Select All** to restore all the ignore inconsistencies for the node.

4. Click **Restore**.

Create New Piping Part Classes

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** ▦ in the ribbon.

3. In the tree view, expand the **Piping > Parts** node.

4. Continue to expand the nodes under **Piping > Parts** until you get to the appropriate piping component type folder.

5. Click **Catalog > New > Class**.

6. On the **General** tab, enter a name for the part class.

7. Select a classification for the part class.

8. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

9. Select the **Definition** tab.

10. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

11. Add any properties that you want to use.

12. Select the **Occurrence** tab.

13. Add any occurrences properties that you want to use.

14. Click **OK**.

📝 **NOTE** You must create a new symbol for the part class or identify an existing symbol to use before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols.

Create New Piping Part Classes using Bulkload

Creating new piping part classes requires editing and bulkloading two Excel workbooks: AllCodeLists.xls and your piping catalog workbook (such as Ten_Specs_CatalogData.xls or Piping Catalog.xls). The software reads the specified commodity type in the part sheet and automatically places it in the correct location in the catalog according to where the commodity type is defined in the **PipingCommodityType** sheet in the **AllCodeLists.xls** workbook.

In AllCodeLists.xls

1. In the **AllCodeLists.xls** workbook, go to the **PipingCommodityType** sheet.

2. Review the sheet to see if there is an existing commodity type for the part class that you want to create. For example, if you want to add a gate valve part class, you would look under Valves > Linear Valves to see if a gate valve commodity type exists.

3. If the Commodity Type exists, note the **Piping Commodity Type Short Description** as you will need it for the part sheet. Continuing the gate valve example, you would note the GAT short description.

4. If the Commodity Type does not exist, add it to the **PipingCommodityType** sheet under the appropriate Commodity Class and Commodity Subclass. You also need to add a unique Codelist number for the new Commodity Type. You must bulkload **AllCodeLists.xls** for your new commodity type to be available.

   As an alternative, you can also add a new Commodity Type in the **Catalog** task by adding a row to the Piping Commodity Type select list, found a t *[Catalog Root]*\Select Lists\Piping commodity Type.

In Your Piping Catalog Workbook

1. Create a new sheet in the workbook for your new part class. The new sheet must have a unique sheet name across your entire catalog.

   TIP You may want to copy an existing sheet of a similar part to create your new part class sheet.

2. In the **Commodity Type** column, enter the **Piping Commodity Type Short Description** or **Codelist Number** that you found on the **PipingCommodityType** sheet in the **AllCodeLists.xls** workbook or the new **Piping Commodity Type Short Description** created in step 4 of the previous procedure. To continue the example, you would enter GAT.

3. At the very top of the part sheet, enter a unique name in the **User Class Name** and the **Occ Class Name** cells. The user class name is the name that will appear in the **Catalog** task.

4. Define the unique commodity code and other part attributes as required.

5. Bulkload the piping catalog.

On-the-fly Instrument Folders

The catalog hierarchy for the parts is formed using the following logic:

+ Parts (use Piping Component Type hierarchy)

    + Valves

        + Linear Valves

            + Gate Valve part classes

                + Geometric Industry Standard

                    + Gate Valve parts (commodity code)

            + Globe Valve part classes

                + Geometric Industry Standard

                    + Globe Valve parts (commodity code)

    + Inline Fittings

        + Flanges

            + Weldneck Flange part classes

                + Geometric Industry Standard

                    + Weldneck Flange parts (commodity code)

Consider the examples below to understand how the hierarchy is formed:

1. Considering the case of ICM3 sheet in the On-the-fly Instruments.xls workbook (which is delivered):

In this example, the commodity type is 5402, hence the corresponding piping commodity class is "In-Line Fittings" and the piping commodity subclass is "In-line instruments, flow measurement".

The Geometric industry standard is "Undefined", the PartClassName is "Coriolis Flow Meter Type 2 GAS", and the Commodity code is "ICM3".

Therefore, the hierarchy will be:

+Parts

    +In-line Fittings

        + In-line instruments, flow measurement

            + Coriolis Flow Meter Type 2 GAS

                +Undefined

                    +ICM3

2. Considering the IDL1C sheet in the On-the-fly Instruments.xls workbook (which is delivered):

In this example commodity type is Undefined, hence the corresponding piping commodity class is "Undefined" and the piping commodity subclass is "Undefined".

The Geometric industry standard is "Undefined", the PartClassName is "Valve with Rotary Diaphragm Actuator Position C 1", and the Commodity code is "IDL1C".

Therefore, the hierarchy will be:

+Parts

    + Undefined

        + Undefined

            + Valve with Rotary Diaphragm Actuator Position C 1

                +Undefined

                    + IDL1C

S ECTION 7

Equipment and Furnishings Reference Data

Before working with equipment and furnishings reference data, you must be familiar with how the software handles reference data in general. If you have not already done so, read and understand the following important concepts and procedures described in the *Smart 3D Reference Data Guide*:

- Custom attributes
- Select Lists (also called Codelists)
- Naming rules
- Bulkloading

For example, before you can define pumps in your reference data, you must understand how pump data relates to data on the custom interfaces sheet, and how that information relates to parameters defined when the pump symbol is created.

The equipment and furnishings reference data is defined in the following nodes:

- **Equipment** - Defines stand-alone pieces of equipment that you can place with the **Place Equipment** command in the **Equipment and Furnishings** task. This node contains the same information that is defined in the **Equipment.xls** workbook delivered to the *[Product Folder]*\CatalogData\BulkLoad\DataFiles folder.

- **Equipment Components** - Defines equipment components, which when combined during placement, create a piece of equipment. The **Place Equipment Component** command in the **Equipment and Furnishings** task uses the information in this node. This node contains the same information that is defined in the **EquipmentComponent.xls** workbook delivered to the *[Product Folder]*\CatalogData\BulkLoad\DataFiles folder.

- **Equipment > Electrical** -Defines electrical equipment that you can place with the **Place Equipment** command in the **Electrical** task. This node contains the same information that is defined in the **ElectricalEquipment.xls** is delivered to the *[Product Folder]*\CatalogData\Bulkload\SampleData folder. You must bulkload this workbook to see the additional data.

- **Standard Nozzle Data** - Defines nozzles and ports used by the **Place Nozzle** command in the **Equipment and Furnishing** task. This node contains the same information as the **StandardNozzleData.xls** workbook. For more information, see *Standard Nozzle Data* (on page 246).

- **Shapes** - Defines the shapes used by the **Place Shape** command in the **Equipment and Furnishing** task. This node contains the same information as the **Shapes.xls** workbook.

Reference data determines the physical representation of the equipment objects that you place in the model. For example, when you place a pump in the model, properties, such as base plate thickness or motor width and diameter, are determined by values that have been defined in the reference data.

Almost all equipment parts are represented by symbols. You can find which symbol is used for a particular delivered part by looking in the **Symbol Definition** column. For example, if you look at the **Pump** node, you will see that SP3DPumpAsm.CPumpSym is the symbol definition. Symbols are named after the text that comes before the period. In this example, the part uses symbol SP3DPumpAsm. For more information on equipment symbols, see the *Smart 3D Reference Data Guide*, accessible from the **Help > Printable Guides** command in the software.

For more information, see *Appendix: Equipment* (on page 505).

What do you want to do?

Define New Equipment Part Class

1. Click **Grid View** in the ribbon.
2. In the tree view, under the **Equipment** node, select the parent folder for your new part class.
3. Click **Catalog > New > Class**.
4. On the **General** tab, enter a name for the part class.
5. Select a classification for the part class.
6. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.
7. Select the **Definition** tab.
8. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.
9. Add any properties that you want to use.
10. Select the **Occurrence** tab.
11. Define any occurrences properties that you want to use.
12. Click **OK**.

Define New Equipment Part

1. Create the symbol and symbol preview, if needed, for the new part (see Note below).
2. Click **Grid View** in the ribbon.
3. In the tree view, click **Equipment** or **Equipment Component** depending on which type of part you are creating.
4. Open the equipment part class to which to add the part. You may have to expand several levels before to get down to the parts.
5. Select an existing part row in the part class.
6. Click **Insert Row** to insert a blank row.

7. Specify the part number. The part number must be unique across the entire catalog.

8. Specify values for the remaining required properties displayed in the grid view.

9. Click **Save** 🖫.

10. Verify that the row you added is selected.

11. Click **Properties** 🗗 in the ribbon.

12. Define the nozzle information for the equipment.

13. Specify values for the optional properties on the **Definition** tab.

14. Click **OK**.

NOTES

- Use **Tab**, **Shift+Tab**, and the arrow keys to move between cells in the grid view.

- If the new part does not use an existing symbol, you must create the new part symbol before creating the new part. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. You can use the delivered equipment symbol as a starting point for your symbol. However, we recommend that you make a copy of the delivered symbol and modify the copy. Do not modify the delivered symbol.

Electrical Reference Data

The reference data for the **Electrical** task is divided into the following areas:

- Defining cableway reference data, including specifications and rules. For more information, see *Cableway Reference Data Common Tasks* (on page 219).

- Defining cable tray reference data, including specifications and parts. For more information, see *Cable Tray Reference Data Common Tasks* (on page 223).

- Defining conduit reference data, including specifications, rules, and parts. For more information, see *Conduit Reference Data Common Tasks* (on page 221).

- Defining cable reference data, including parts.

- Defining electrical symbols for cable tray and conduit. For more information about symbols, see the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

See Also
Conduit Reference Data Common Tasks (on page 221)

Cableway Reference Data Common Tasks

By following these tasks in order, you can create and customize your own cableway reference data.

Define Cableway Specifications

Your first step is to define the cableway specifications for your project.

Define Cableway Specification Rules

After defining the cableway specifications, you define the rules associated with the specifications.

What do you want to do?

- *Define Cableway Specifications* (on page 220)
- *Define Cableway Bend Radius* (on page 220)
- *Define Cableway Shapes* (on page 220)

Define Cableway Specifications

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Cableway > Specifications > Cable Way Specifications**.

3. Click **Insert Row** to insert a blank row.

4. In the **Spec Name** column, type a name for the cableway specification.

5. In the **Is Tray Specification** column, select **No**.

6. Specify values for the remaining specification properties.

7. Click **Save**.

Define Cableway Bend Radius

1. Click **Grid View** in the ribbon.

2. In the tree view, expand **Cableways > Specifications > Cable Way Specifications**.

3. Under **Cable Way Specifications**, expand the cableway specification, and then click **Bend Radius**.

4. Click **Insert Row** to insert a blank row.

5. In the **Bend Radius** column, type the bend radii that you want to associate with the specification.

6. Repeat steps 4 and 5 to define all the bend radii that you need.

7. Click **Save**.

Define Cableway Shapes

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Cableway > Specifications > Cable Way Specifications**.

3. Under **Cable Way Specifications**, expand the cableway specification, and then expand **Shapes**.

4. Select the shape subfolder (flat oval, rectangular, or round) to which to add the shape.

5. Click **Insert Row** to insert a blank row.

6. Define the shape properties.

7. Click **Save**.

Conduit Reference Data Common Tasks

By following these tasks in order, you can create and customize your own conduit reference data.

Define Conduit Specifications

Your first step is to define the conduit specifications for your project.

Define Conduit Specification Rules

After defining the conduit specifications, you define the rules associated with the specifications. These rules involve filters, material control data, nominal diameters, and default commodity selection rules.

Define Conduit Parts

Parts are placed in the model. In addition to the parts that are delivered with the software, you can add your own parts to the catalog for placement.

What do you want to do?

- *Define Conduit Specifications* (on page 221)
- *Define the Conduit Default Commodity Selection Rule* (on page 222)
- *Define Conduit Filters* (on page 222)
- *Define Conduit Nominal Diameters* (on page 222)
- *Define Conduit Commodity Material Control Data* (on page 223)

Define Conduit Specifications

1. Click **Grid View** 🏛 in the ribbon.
2. In the tree view, click **Conduit > Specifications**.
3. Click **Insert Row** ⌐.
4. In the **Spec Name** column, type a name for the conduit specification.
5. In the **Material** column, type the conduit material for this specification.
6. In the **Service** column, type the intended service for this specification.
7. Click **Save** 💾.
8. Define the conduit filter for the specification. For more information, see *Define Conduit Filters* (on page 222).
9. Define the permission conduit diameters for the specification. For more information, see *Define Conduit Nominal Diameters* (on page 222).

📝 NOTE For more information about each specification property that you can define, refer to *Conduit Specifications* (on page 526).

Define the Conduit Default Commodity Selection Rule

1. Click **Grid View** ![icon] in the ribbon.

2. In the tree view, click **Conduits > Selection Rules > Default Conduit Commodity Selection Rule**.

3. Click **Insert Row** ![icon].

4. In the **Feature Type** column, select the feature type.

5. In the **Functional Short Code** column, select the conduit short code.

6. Click **Save** ![icon].

Define Conduit Filters

1. Click **Grid View** ![icon] in the ribbon.

2. In the tree view, click **Conduit > Specifications >** <spec name> **> Conduit Filter**.

3. In the **Short Code** column, select a short code.

4. In the **First Size From**, **First Size To**, and **First Size Units** columns, define the size range to which this filter applies.

5. In the **Contractor Commodity Code**, specify the contractor commodity code.

6. Click **Save** ![icon].

▤ NOTES

- You must define the conduit nominal diameters before you can define the conduit filter. For more information, see *Define Conduit Nominal Diameters* (on page 222).

- For more information about each column on the **Conduit Filter**, refer to *Conduit Filter* (on page 526).

Define Conduit Nominal Diameters

1. Click **Grid View** ![icon] in the ribbon.

2. In the tree view, click **Conduit > Specifications >** <spec name> **> Conduit Rules > Permissible Nominal Conduit Diameters Rule**.

3. Click **Insert Row** ![icon] on the ribbon.

4. In the **Nominal Diameter** column, type the nominal diameters that you want to define in your conduit materials class.

5. In the **Unit Type** column, type the units for your nominal diameter. For example, type **mm** or **in**.

6. Click **Save** ![icon].

Define Conduit Commodity Material Control Data

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Conduit > Commodity Material Control Data**.

3. Click **Insert Row** to insert a blank row.

4. In the **Industry Commodity Code** column, type the industry commodity code.

5. In the **Contractor Commodity Code** column, type the contractor commodity code.

6. Specify values for the remaining properties as required.

7. Click **Save** .

Cable Tray Reference Data Common Tasks

By following these tasks in order, you can create and customize your own cable tray reference data.

Define Cable Tray Specifications

Your first step is to define the cable tray specifications for your project.

Define Cable Tray Symbols

Almost all parts that you will place in the model are represented by a symbol. A symbol is a graphical representation of the part. In addition to the symbols that are delivered with the software, you can create your own custom symbols for placement in the model.

Define Cable Tray Parts

Parts are placed in the model. In addition to the parts that are delivered with the software, you can add your own parts to the catalog for placement.

Define Cable Tray Specifications

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Cableway > Specifications > Cable Tray Specification**.

3. Click **Insert Row** to insert a blank row.

4. In the **Spec Name** column, type a name for the cable tray specification.

5. In the **Is Tray Specification** column, select **Yes**.

6. Specify values for the remaining properties as needed.

7. Click **Save** .

NOTE For more information about each property column, see *Cable Tray Specifications* (on page 512).

S E C T I O N 9

Structure Reference Data

You can define the structural reference data either in the **Catalog** task or using the Microsoft Excel workbooks delivered in the *[Product Folder]*\CatalogData\Bulkload\Datafiles folder. For information about editing the Microsoft Excel workbooks to define the structure reference data, refer to the *Structure Reference Data Guide*.

The structure reference data uses both two-dimensional and three-dimensional symbols. The 2-D symbols are used for member and wall cross-sections. For more information on creating 2-D symbols, see the *2D Symbols User's Guide*. The 3-D symbols are used to represent stairs, ladders, handrails, footings, and equipment foundations in the model. For more information on creating 3-D symbols, see the *Smart 3D Reference Data Guide*.

Most Structure part classes, the exceptions being plates and slabs, require special Smart Occurrence symbols and code be written before new unique part classes can be created in the Catalog. For more information about creating the symbols, refer to the *Smart 3D Reference Data Guide.* For more information about coding, refer to the *Intergraph Smart™ 3D Programmer's Guide*. You can also look at the delivered samples and use those as a starting point for your custom part classes.

Member Reference Data

- The **Structure > Materials** node defines material grades and material grade properties. For more information, see the *Reference Data Guide*.

- The **Structure > Objects > Connections > Logical Connections > Frame Connections** node defines frame connections. Frame connections describe the positioning relationship between member systems. For more information, see *Frame Connections* (on page 552).

- The **Structure > Objects > Connections > Assembly Connections** node defines assembly connections that you can place using the Place Assembly Connection command in the **Structure** task. Member assembly connections are similar to frame connections, but define the necessary trimming between member parts (copes and cutbacks) and the generation of parts such as base plates, gusset plates, clip angles, and column splices. For more information, see *Frame Assembly Connections* (on page 530).

- The **Structure > Plates** node contains the plates information used in the assembly connections.

- The **Structure > Objects > Connections > Logical Connections > Split Connections** node defines split connections. Split connections describe the division of member systems into member parts. For more information, see *Split Connections* (on page 563).

- The **Structure > Objects > Insulation > Fireproofing** node defines the encasement rules used in the **Structure** task's **Place Fireproofing** command. For more information, see *Fireproofing Insulation Encasement Rules* (on page 568).

- There are several cross-section workbooks that define the geometry and engineering properties associated with member cross- sections. The current cross-section workbooks are:

- **StructCrossSections-AISC-LRFD-3.0.xls** - Contains the American Institute of Steel Construction - Manual of Steel Construction (LRFD) version 3.0 cross-sections. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-AISC-LRFD-3.1.xls** - Contains American Institute of Steel Construction version 3.1 cross-sections.

- **StructCrossSections-AISC-METRIC.xls** - Contains metric values from the American Institute of Steel Construction (AISC) - Manual of Steel Construction (LRFD) dated 2008, version 3.1.

- **StructCrossSections-AISC-SHAPES-3.1.xls** - Contains American Institute of Steel Construction - Manual of Steel Construction (LRFD) version 3.1 (2003). This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-AUST-05.xls** - Contains Australian Steel Table - 2005 - OneSteel Electronic Catalog Version 2.0.7 cross-sections. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-AUST.xls** - Contains Australian Steel Table - 2003 - OneSteel Electronic Catalog Version 1 cross-sections. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-BS.xls** - Contains the British Steel Table as described in BSI BS5950-1:2000. Includes structural use of steelwork in building, code of practice for design, and rolled and welded sections.

- **StructCrossSections-Chile-2000.xls** - Contains the Chilean Steel Table - 2000. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-China-2006.xls** - Contains Chinese GB (Guojia Biaozhun) and Standard Steel Tables from Standardization Administration of China. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-CISC_7.2.xls** - Contains Canadian Institute of Steel Construction, *Handbook of Steel Construction*, Seventh Edition - Second Revised Printing (July 2000). This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-CISC_8.1.xls** - Contains Canadian Institute of Steel Construction, *Handbook of Steel Construction*, Eighth Edition - First Printing. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-ConcreteShapes_english-1.0.xls** - Contains American Concrete Institute (ACI) concrete shapes in imperial units. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-ConcreteShapes_metric-1.0.xls** - Contains American Concrete Institute (ACI) concrete shapes in metric units. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-Euro.xls** - Contains European cross-sections. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but it is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-Euro-OTUA-2002.xls** - Contains the OTUA Edition 2002 cross-sections from Office Technique Pour l'Utilisation de l'Acier Caracteristiques geometriques et statiques Code 15.001. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-Japan-2005.xls** - Contains Japanese cross-sections based on JIS G 3194. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-Japan.xls** - Contains Japanese cross-sections. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-MISC-SHAPES-1.0.xls** - Contains miscellaneous rectangular solid and circular solid cross-sections.

- **StructCrossSections-MISCSeam-SHAPES-1.0.xls** - Contains miscellaneous hollow rectangular and hollow circular cross-sections that have a seam indicator defined.

- **StructCrossSections-OffshorePipes.xls** - Contains American Petroleum Institute sections used in jacket legs. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-Russia.xls** - Contains Russian Steel Table; 2006, version 1. This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

- **StructCrossSections-SAISC-2002.xls** - Contains South African Institute of Steel Construction (2002). This workbook is delivered with the software in the *[Product Folder]*\CatalogData\Bulkload\AdditionalDataFiles folder, but is not bulk loaded. If you want to use these sections, you will need to bulk load the workbook into your catalog database.

Slabs, Walls, and Openings Reference Data

- The **Structure > Objects > Openings** node defines standard opening shapes that you can place using the Place Opening command in the **Structure** task. For more information, see *Openings* (on page 571).

- The **Structure > Objects > Slabs** node defines slabs that you can place using the Place Slab command in the **Structure** task. Some sample data is delivered for your reference. For more information, see *Slabs* (on page 575).

- The **Structure > Objects > Slabs > Layers** node defines layers for slabs. Some sample data is delivered for your reference. For more information, see *Layers* (on page 578).

- The **Structure > Objects > Walls** node defines slabs that you can place using the Place Wall command in the **Structure** task. Some sample data is delivered for your reference. For more information, see *Walls* (on page 580).

- The **Structure > Objects > Walls > Layers** node defines layers for walls. Some sample data is delivered for your reference. For more information, see *Layers* (on page 583).

Traffic Reference Data

- The **Structure > Objects > Handrails** node defines handrails that you can place using the Place Handrail command in the **Structure** task. Some sample handrails are delivered for your reference. For more information, see *Handrails* (on page 567).

- The **Structure > Objects > Ladders** node defines ladders that you can place using the Place Ladder command in the **Structure** task. Some sample ladders are delivered for your reference. For more information, see *Ladders* (on page 570).

- The **Structure > Objects > Stairs** node defines stairs that you can place using the Place Stair Command in the **Structure** task. Some sample stairs are delivered for your reference. For more information, see *Stairs* (on page 579).

Equipment Foundations and Footings Reference Data

- The **Structure > Objects > Equipment Foundations** node defines equipment foundations that you can place using the Place Equipment Foundation command in the **Structure** task. Some sample equipment foundations are delivered for your reference. For more information, see *Equip Foundations* (on page 564).

- The **Structure > Objects > Footings** node defines footings that you can place using the Place Footing command in the **Structure** task. For more information, see *Footings* (on page 566).

Connections Reference Data

- The **Structure > Objects > Connections > Logical Connections > Frame Connections** node defines frame connections. Frame connections describe the positioning relationship between member systems. For more information, see *Frame Connections* (on page 552).

- The **Structure > Objects > Connections > Assembly Connections > Frame Assembly Connections** node defines assembly connections that you can place using the Place Assembly Connection command in the **Structure** task. Member assembly connections are similar to frame connections, but define the necessary trimming between member parts (copes and cutbacks) and the generation of parts such as base plates, gusset plates, clip angles, and column splices. For more information, see *Frame Assembly Connections* (on page 530).

- The **Structure > Objects > Connections > Assembly Connections > Slab Assembly Connection** node defines the slab assembly connections that are placed when placing slabs. For more information, see *Slab Assembly Connections* (on page 542).

See Also
Frame Connections (on page 552)
Split Connections (on page 563)

Defining Member Related Catalog Data

Member related catalog data refers to section libraries, sections available in section libraries, frame connections, assembly connections, and split connections.

What do you want to do?

- *Add Section Libraries to the Catalog* (on page 229)
- *Add Sections to a Library* (on page 229)
- *Edit Section Properties* (on page 230)
- *Delete Sections from Library* (on page 230)
- *Add a new part class* (on page 231)
- *Edit part class properties* (on page 231)
- *Delete a part class* (on page 231)
- *Add a new Reference Standard* (on page 232)
- *Edit Reference Standard properties* (on page 232)
- *Delete a Reference Standard* (on page 232)

Add Section Libraries to the Catalog

1. Log in to an administrator computer that has the Bulkload Reference Data and Server Connectivity features installed.

2. Click **Start > All Programs > Intergraph Smart 3D > Database Tools > Bulkload Reference Data** to start the Bulkload utility.

3. Click **Add**.

4. Browse to the *[Product Folder]*\CatalogData\BulkLoad\AdditionalDataFiles folder.

5. Select the cross section library workbook that you want to add to your catalog. The cross section library workbook names begin with "StructCrossSection". You can bulkload more than one at a time.

6. Select the **Append to existing catalog** option.

7. Select the database type and the database server name.

8. In the **Database name** box, select your catalog database.

9. In the **Catalog schema database** box, select your catalog schema database.

10. Enter a log file path and name, for example, c:\bulkload.log.

11. Click **Load**.

⊟ NOTE You can have as many section libraries in the catalog as you need. You can use sections from multiple section libraries in your model at the same time.

Add Sections to a Library

1. Expand **Structure > Shapes**.

2. Expand the section library node (such as AISC-LRFD-3.1 or Euro) to display the shapes available in that library.

3. Select the shape node (such as W or WT) to which you want to add your new section.

4. Click **Grid View** on the ribbon bar.

5. Click **Insert Row** on the ribbon bar to display Add/Edit Cross Section properties dialog box.

6. In the **Section Name** box, enter a name for your new section. This is the name by which the section is accessed in the **Structure** task.

7. Define the remaining section properties. If you are unsure of what a property is, refer to that cross-section's information in the Structure appendix (for example, if you are creating a W section, refer to *Cross Section Symbol W (M)* (on page 666)).

8. Click **Apply,** and then click **OK**.

9. Click **Cancel** to cancel creating a new cross-section.

10. Click **Save** .

NOTE Behavior of the properties is controlled by the XML Schema for Cross Section Editor delivered to *[Product Folder]\[Product Reference Data Folder]*\SharedContent\Xml\Structure folder. For more information, refer *XML Schema for Cross Section Editor* (on page 676).

Edit Section Properties

1. Expand **Structure > Shapes**.

2. Expand the section library node (such as AISC-LRFD-3.1 or Euro) to display the shapes available in that library.

3. Select the shape node (such as W or WT) that contains the section to edit.

4. Click **Grid View** on the ribbon bar.

5. Click **Properties** to display Add/Edit properties dialog box.

6. Edit the section properties as needed. If you are unsure of what a property is, refer to that cross-section's information in the Structure appendix (for example, if you are editing a W section, refer to *Cross Section Symbol W (M)* (on page 666)).

7. Check the **Calculate properties** check box, and then click **Calculate** to calculate the properties implicitly, otherwise enter the values manually.

8. Click **Apply** and then click **OK**.

9. Click **Cancel** to cancel the modifications.

10. Click **Save** .

Delete Sections from Library

1. Expand **Structure > Shapes**.

2. Expand the section library node (such as AISC-LRFD-3.1 or Euro) to display the shapes available in that library.

3. Select the shape node (such as W or WT) that contains the section to delete.

4. Click **Grid View** on the ribbon bar.

5. Select the section, and then click **Delete** on the ribbon bar. You can also delete from right-click popup menu.

    TIP You can also delete multiple sections.

6. Click **Save** .

Add a new part class

1. Expand **Structure > Shapes**.

2. Expand the tree view and select destination section library node (such as AISC-LRFD-3.1 or Euro).

3. Click **Catalog > New > Class** on the menu bar to display **New Class** dialog box. For more information, see *New Class Dialog Box* (on page 52).

   ● **TIP** You can also create part class from right-click popup menu. Right-click on section library node and select **Class**.

4. Enter all the required inputs.

5. Click **Apply,** and then click **OK**.

   A new cross-section part class is added to the specified Reference Standard.

6. Click **Save** 💾.

See Also

Copy Part Classes within the same Catalog (on page 89)

Edit part class properties

1. Expand **Structure > Shapes**.

2. Expand the tree view and select destination section library node (such as AISC-LRFD-3.1 or Euro).

3. Select the shape node (such as W or WT) that you want to modify.

4. Click **Properties** 🗔 on the horizontal toolbar to display part properties dialog box (for example, if you are editing a W section, W section properties dialog box is displayed).

5. Modify appropriate properties.

6. Click **Apply**, and then click **OK**.

7. Click **Save** 💾.

Delete a part class

1. Expand **Structure > Shapes**.

2. Expand the tree view and select destination section library node (such as AISC-LRFD-3.1 or Euro).

3. Select the shape node (such as W or WT) that you want to delete.

4. Click **Delete** ✕ on the ribbon bar. You can also delete from right-click popup menu.

5. Click **Save** 💾.

🗐 **NOTES**

- The cross-section part class including all cross-sections in it will be deleted.

- You cannot re-use a part class name even after deletion.

Add a new Reference Standard

1. Expand **Structure > Shapes**.

2. Click **Catalog > New > Folder** on the menu bar.

   TIP You can also create Reference Standard from right-click popup menu. Right-click on **Shapes** node and select **New Folder**.

   You will be prompted for a new Reference Standard name.

3. Enter a name for the Reference Standard.

4. Click **Save** 💾.

See Also

New Folder Command (on page 56)

Edit Reference Standard properties

1. Expand **Structure > Shapes**.

2. Select the destination section library node (such as AISC-LRFD-3.1 or Euro).

3. Click **Properties** 📑 on the ribbon bar to display *Reference Data Properties Dialog Box* (on page 962).

4. Modify appropriate properties.

5. Click **Apply,** and then click **OK**.

6. Click **Save** 💾.

Delete a Reference Standard

1. Expand **Structure > Shapes**.

2. Select the destination section library node (such as AISC-LRFD-3.1 or Euro).

3. Click **Delete** ✖ on the ribbon bar. You also delete from right-click popup menu.

4. Click **Save** 💾.

NOTE The Reference Standard including all part classes in it will be deleted.

Defining Footings and Equipment Foundations Catalog Data

Footing and equipment foundations are used by the **Place Footing** and **Place Equipment Foundation** commands in the **Structure** task.

What do you want to do?

- *Define New Footing Part* (on page 233)
- *Define New Footing Part Class* (on page 234)
- *Define New Equipment Foundation Part* (on page 234)
- *Define New Equipment Foundation Part Class* (on page 235)

Define New Footing Part

1. Click **Grid View** in the ribbon.
2. In the tree view, click **Structure > Objects > Footings**.
3. Open the footing part class to which to add the footing part.
4. Select an existing part row in the footing part class.
5. Click **Insert Row** to insert a blank row.
6. Specify the part number. The part number must be unique across the entire catalog.
7. Specify values for the remaining required properties displayed in the grid view.
8. Select another part row so that the software saves your new part. Then, re-select your new part row.
9. Click **Properties** in the ribbon.
10. Specify values for the optional properties on the **Definition** tab.
11. Click **OK**.

For more information, see *Footings* (on page 566).

Define New Footing Part Class

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** in the ribbon.

3. In the tree view, click **Structure > Objects > Footings**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

NOTE You must create a new symbol and macro code for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. Refer to the *Intergraph Smart™ 3D Programmer's Guide* for more information about coding the macro. You can use the delivered macro as a starting point for your macro. However, we recommend that you make a copy of the delivered macro and modify the copy. Do not modify the delivered macro.

For more information, see *Footings* (on page 566) and *New Class* (on page 50)

Define New Equipment Foundation Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Equipment Foundations**.

3. Open the part class to which to add the equipment foundation part.

4. Select an existing part row in the equipment foundation part class.

5. Click **Insert Row** to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, re-select your new part row.

9. Click **Properties** in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

NOTES

- Use **Tab**, **Shift+Tab**, and the arrow keys to move between cells in the grid view.

- The software automatically saves the data that you enter when you select another row, select another node in the tree view, or select another command.

- If you select another row before entering all the required data, the software displays a message about the missing data.

For more information, see *Equip Foundations* (on page 564).

Define New Equipment Foundation Part Class

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** 🏛 in the ribbon.

3. In the tree view, click **Structure > Objects > Equipment Foundations**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

NOTE You must create a new symbol and macro code for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. Refer to the *Intergraph Smart™ 3D Programmer's Guide* for more information about coding the macro. You can use the delivered macro as a starting point for your macro. However, we recommend that you make a copy of the delivered macro and modify the copy. Do not modify the delivered macro.

For more information, see *Equip Foundations* (on page 564).

Defining Traffic Related Catalog Data

Traffic related catalog data refers to handrails, stairs, and ladders.

What do you want to do?

- *Define New Handrail Part* (on page)
- *Define New Handrail Part Class* (on page 237)
- *Define New Ladder Part* (on page 237)
- *Define New Ladder Part Class* (on page 238)
- *Define New Stair Part* (on page 238)
- *Define New Stair Part Class* (on page 239)

Define New Handrail Part

1. Click **Grid View** in the ribbon.
2. In the tree view, click **Structure > Objects > Handrails**.
3. Open the handrail part class to which to add the handrail part. (The delivered handrail part classes are named **Handrail TypeA**, **Handrail TypeA Side Mounted**, **Handrail TypeA Top Embedded**, and **Handrail TypeA Top Mounted**.)
4. Select an existing part row in the handrail part class.
5. Click **Insert Row** to insert a blank row.
6. Specify the part number. The part number must be unique across the entire catalog.
7. Specify values for the remaining required properties displayed in the grid view.
8. Select another part row so that the software saves your new part. Then, re-select your new part row.
9. Click **Properties** in the ribbon.
10. Specify values for the optional properties on the **Definition** tab.
11. Click **OK**.

For more information, see *Handrails* (on page 567).

Define New Handrail Part Class

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** ⊞ in the ribbon.

3. In the tree view, click **Structure > Objects > Handrails**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

📝 **NOTE** You must create a new symbol and macro code for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. Refer to the *Intergraph Smart™ 3D Programmer's Guide* for more information about coding the macro. You can use the delivered macro as a starting point for your macro. However, we recommend that you make a copy of the delivered macro and modify the copy. Do not modify the delivered macro.

For more information, see *Handrails* (on page 567) and *New Class* (on page 50).

Define New Ladder Part

1. Click **Grid View** ⊞ in the ribbon.

2. In the tree view, click **Structure > Objects > Ladders**.

3. Open the ladder part class to which to add the ladder part. (The delivered ladder part class is named **Ladder TypeA**.)

4. Select an existing part row in the ladder part class.

5. Click **Insert Row** ⱻ to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, re-select your new part row.

9. Click **Properties** 🗗 in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

For more information, see *Ladders* (on page 570).

Define New Ladder Part Class

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** in the ribbon.

3. In the tree view, click **Structure > Objects > Ladders**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

NOTE You must create a new symbol and macro code for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. Refer to the *Intergraph Smart™ 3D Programmer's Guide* for more information about coding the macro. You can use the delivered macro as a starting point for your macro. However, we recommend that you make a copy of the delivered macro and modify the copy. Do not modify the delivered macro.

For more information, see *Ladders* (on page 570) and *New Class* (on page 50).

Define New Stair Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Stairs**.

3. Open the stair part class to which to add the stair part. (The delivered stair part class is named **Stair TypeA**.)

4. Select an existing part row in the stair part class.

5. Click **Insert Row** to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, re-select your new part row.

9. Click **Properties** in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

For more information, see *Stairs* (on page 579).

Define New Stair Part Class

1. Create the symbol, symbol preview, and macro code for the new part class (see Note below).

2. Click **Grid View** in the ribbon.

3. In the tree view, click **Structure > Objects > Stairs**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

NOTE You must create a new symbol and macro code for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols. Refer to the *Intergraph Smart™ 3D Programmer's Guide* for more information about coding the macro. You can use the delivered macro as a starting point for your macro. However, we recommend that you make a copy of the delivered macro and modify the copy. Do not modify the delivered macro.

For more information, see *Stairs* (on page 579) and *New Class* (on page 50).

Defining Slab, Wall, and Opening Catalog Data

The slab catalog data is used by the **Place Slab** command. The wall catalog data is used by the **Place Wall** command. The opening catalog data is used by the **Place Opening** command. All three commands are in the **Structure** task.

What do you want to do?

- *Define New Slab Composition Part* (on page 240)
- *Define New Slab General Part* (on page 241)
- *Define New Slab Layer Part* (on page 241)
- *Define New Slab Layer Part Class* (on page 242)
- *Define New Opening Part* (on page 242)
- *Define New Opening Part Class* (on page 243)
- *Define New Plate Part* (on page 243)
- *Define New Wall Layer Part Class* (on page 244)
- *Define New Wall Layer Part* (on page 244)
- *Define New Wall Composition Part* (on page 245)
- *Define New Wall General Part* (on page 245)

Define New Slab Composition Part

1. Click **Grid View** in the ribbon.
2. In the tree view, click **Structure > Objects > Slabs > Composition > Slab Composition**.
3. Select an existing composition part row.
4. Click **Insert Row** to insert a blank row.
5. Specify the part number. The part number must be unique across the entire catalog.
6. Specify the slab layers for the composition.
7. Select another part row so that the software saves your new part. Then, re-select your new part row.
8. Click **Properties** in the ribbon.
9. Specify values for the optional properties on the **Definition** tab.
10. Click **OK**.

NOTES

- You must define the layers to use in composition before you can define the composition. For more information, see *Define New Slab Layer Part* (on page 241).
- Use **Tab**, **Shift+Tab**, and the arrow keys to move between cells in the grid view.

- The software automatically saves the data that you enter when you select another row, select another node in the tree view, or select another command.

- If you select another row before entering all the required data, the software displays a message about the missing data.

For more information, see *Slabs* (on page 575).

Define New Slab General Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Slabs > General > Slab General**.

3. Select an existing part row in the slab layer part class.

4. Click **Insert Row** to insert a blank row.

5. Specify the part number. The part number must be unique across the entire catalog.

6. Specify values for the remaining required properties displayed in the grid view.

7. Select another part row so that the software saves your new part.

NOTE You must define the slab compositions before you can define general slab parts. For more information, see *Define New Slab Composition Part* (on page 240).

For more information, see *Slabs* (on page 575).

Define New Slab Layer Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Slabs > Layers**.

3. Open the slab layer part class to which to add the layer part.

4. Select an existing part row in the slab layer part class.

5. Click **Insert Row** to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, reselect your new part row.

9. Click **Properties** in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

For more information, see *Slabs* (on page 575) and *Layers* (on page 583).

Define New Slab Layer Part Class

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Slabs > Layers**.

3. Click **Catalog > New > Class**.

4. On the **General** tab, enter a name for the part class.

5. Select a classification for the part class.

6. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

7. Select the **Definition** tab.

8. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

9. Add any properties that you want to use.

10. Select the **Occurrence** tab.

11. Define any occurrences properties that you want to use.

12. Click **OK**.

For more information, see *Slabs* (on page 575) and *New Class* (on page 50).

Define New Opening Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Objects > Openings**.

3. Open the opening part class to which to add the opening part. (The delivered opening part classes are named **OvalOpening**, **RectangleOpening**, **SquareOpening**, and **TriangleOpening**.)

4. Select an existing part row in the opening part class.

5. Click **Insert Row** to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, reselect your new part row.

9. Click **Properties** in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

For more information, see *Openings* (on page 571).

Define New Opening Part Class

1. Create the symbol and symbol preview for the new part class (see note below).

2. Click **Grid View** in the ribbon.

3. In the tree view, click **Structure > Objects > Openings**.

4. Click **Catalog > New > Class**.

5. On the **General** tab, enter a name for the part class.

6. Select a classification for the part class.

7. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

8. Select the **Definition** tab.

9. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

10. Add any properties that you want to use.

11. Select the **Occurrence** tab.

12. Define any occurrences properties that you want to use.

13. Click **OK**.

NOTE You must create a new symbol for the part class before creating the new part class. Refer to the *Smart 3D Reference Data Guide* for more information on creating symbols.

For more information, see *Openings* (on page 571) and *New Class* (on page 50).

Define New Plate Part

1. Click **Grid View** in the ribbon.

2. In the tree view, click **Structure > Plates**.

3. Select an existing part row.

4. Click **Insert Row** to insert a blank row.

5. Specify a plate description.

6. Specify the plate thickness.

7. Select another part row so that the software saves your new part.

For more information, see *Stairs* (on page 579).

Define New Wall Layer Part Class

1. Click **Grid View** ⊞ in the ribbon.

2. In the tree view, click **Structure > Objects > Walls > Layers**.

3. Click **Catalog > New > Class**.

4. On the **General** tab, enter a name for the part class.

5. Select a classification for the part class.

6. Enter a symbol definition and a preview graphic for the part class. See the *Smart 3D Reference Data Guide* for more information on symbol definitions and preview graphics.

7. Select the **Definition** tab.

8. Select a Category to sort the available properties. Select **<All>** to display all available properties. Properties that are grayed out are required and cannot be removed.

9. Add any properties that you want to use.

10. Select the **Occurrence** tab.

11. Define any occurrences properties that you want to use.

12. Click **OK**.

For more information, see *Walls* (on page 580) and *New Class* (on page 50).

Define New Wall Layer Part

1. Click **Grid View** ⊞ in the ribbon.

2. In the tree view, click **Structure > Objects > Walls > Layers**.

3. Open the wall layer part class to which to add the layer part.

4. Select an existing part row in the wall layer part class.

5. Click **Insert Row** ⊐ₑ to insert a blank row.

6. Specify the part number. The part number must be unique across the entire catalog.

7. Specify values for the remaining required properties displayed in the grid view.

8. Select another part row so that the software saves your new part. Then, reselect your new part row.

9. Click **Properties** ⊞ in the ribbon.

10. Specify values for the optional properties on the **Definition** tab.

11. Click **OK**.

For more information, see *Walls* (on page 580) and *Layers* (on page 578).

Define New Wall Composition Part

1. Click **Grid View** 🏢 in the ribbon.

2. In the tree view, click **Structure > Objects > Walls > Composition > Wall Composition**.

3. Select an existing composition part row.

4. Click **Insert Row** ⧉ to insert a blank row.

5. Specify the part number. The part number must be unique across the entire catalog.

6. Specify the wall layers for the composition.

7. Select another part row so that the software saves your new part. Then, reselect your new part row.

8. Click **Properties** 🖼 in the ribbon.

9. Specify values for the optional properties on the **Definition** tab.

10. Click **OK**.

📝 **NOTE** You must define the layers to use in composition before you can define the composition. For more information, see *Define New Wall Layer Part* (on page 244).

For more information, see *Walls* (on page 580).

Define New Wall General Part

1. Click **Grid View** 🏢 in the ribbon.

2. In the tree view, click **Structure > Objects > Walls > General > Wall General**.

3. Select an existing part row in the wall layer part class.

4. Click **Insert Row** ⧉ to insert a blank row.

5. Specify the part number. The part number must be unique across the entire catalog.

6. Specify values for the remaining required properties displayed in the grid view.

7. Select another part row so that the software saves your new part.

📝 **NOTE** You must define the wall compositions before you can define general wall parts. For more information, see *Define New Wall Composition Part* (on page 245).

For more information, see *Walls* (on page 580).

S E C T I O N 1 0

Standard Nozzle Data

The **Standard Nozzle Data** node contains data for nozzles in the piping and electrical disciplines.

Piping Straight Nozzles

Specifies data for piping straight nozzles. For more information, see *Piping Straight Nozzles* (on page 253).

Piping Elbow Nozzles

Specifies data for piping elbow nozzles. For more information, see *Piping Elbow Nozzles* (on page 250).

Conduit Ports

Specifies data for conduit ports. For more information, see *Conduit Ports* (on page 248).

Cable Nozzle

Specifies data for cable nozzles. For more information, see *Cable Nozzles* (on page 246).

Cable Tray Ports

Specifies data for cable tray ports. For more information, see *Cabletray Ports* (on page 247).

Cable Nozzles

The **Cable Nozzle** node is not currently being used.

See Also
Standard Nozzle Data (on page 246)

Cabletray Ports

The **Cabletray Ports** node defines reference data for cable tray ports.

When defining cable tray ports, remember that there are three sets of dimensions: nominal, actual, and load. The nominal width and nominal depth dimensions are what the cable tray port is commonly called or referred to. The actual width and actual depth dimensions are the real world dimensions of the cable tray port if you used a measuring tape to measure the port. The load width and load depth dimensions are the "inside" dimensions available in the cable tray port for the placement of cables. The software uses the load width and load depth dimensions when calculating allowable fill area. In the delivered ports, the load width and load depth are set equal to the nominal width and nominal depth. However, you can edit the load width and load depth dimensions if needed.
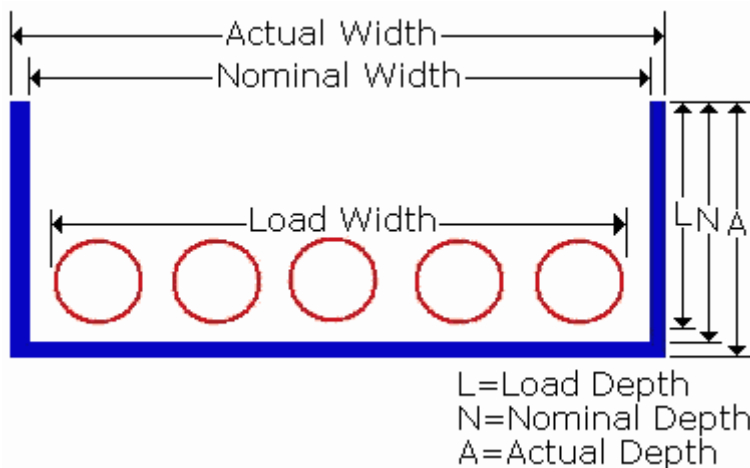
Actual Width

Enter the actual width of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Actual Depth

Enter the actual depth of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Internal ID

This column is not currently being used.

Load Width

Enter the load width of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Load Depth

Enter the load depth of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Nominal Width

Enter the nominal width of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Nominal Depth

Enter the nominal depth of the port. Include the units, such as **in** for inches or **mm** for millimeters.

Port Index

Enter the port index number.

See Also

Standard Nozzle Data (on page 246)

Conduit Ports

The **Conduit Ports** node defines reference data for conduit ports.

End Practice (Required)

Select the end practice for the conduit port. The end practices are defined in the End Standard select list.

End Preparation (Required)

Select the end preparation for the conduit port. The end preparations are defined in the End Preparation select list.

End Standard (Required)

Select the end standard for the conduit port. The end standards are defined in the End Standard select list.

Flange or Hub Outside Diameter (Required)

Enter the flange's outside diameter for the conduit. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange or Hub Thickness (Required)

Enter the distance from the outermost flange face to the back surface of the flange on which the nut rests. Include any projections that the flange may have, such as a raised face, only if the manufacturer's data includes any projections or if specified by the standard. The flange thickness should include the thickness of the loose flange used, but not include the wall thickness of the pipe or stub end for lap-flanged ends.

Flange or Mechanical Groove Width (Required)

Enter the groove width of the conduit, if applicable to groove flanged ends. This value is required to compute the gasket outside diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange Projection or Socket Offset (Required)

Enter the width of any projections that the flange may have, such as raised faces. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flow Direction (Required)

Select the flow direction for the port. Specifying the correct flow direction code for each part port is very important because the software automatically orients the part to the flow direction of the conduit or port to which the part is connected.

Internal ID

This column is not currently being used.

Liner Thickness at Face of Flange (Required)

Specify the thickness of the lining material at the face of the flange at any field-lined bolted fittings.

Liner Thickness at Inside Diameter (Required)

Specify the thickness of the lining material at the inside diameter of field-lined fittings.

Nominal Size

Type the nominal piping diameter for the conduit port.

Npd Unit Type

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping Inside Diameter (Optional)

Enter the inside diameter at the port. If you do not specify a value here, the software calculates the inside diameter as the outside diameter minus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Piping Outside Diameter (Optional)

Enter the outside diameter at the port. If you do not specify a value here, the software calculates the outside diameter as the inside diameter plus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value.

Piping Point Basis (Required)

Select the function of the port.

Port ID

Specifies a description of the port.

Port Index

Enter the port index number.

Pressure Rating

Set to Undefined.

Raised Face or Socket Diameter (Optional)

Enter the raised-face diameter of the port, if applicable to raised- face flanged ends. This property also applies to the diameter of small male flange faces and large male flange faces. This value is required to compute the gasket outside diameter and the gasket inside diameter. This column is also used to enter the socket or thread diameter of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Rating Practice (Optional)

Select the pressure rating practice for the port.

Reinforced Wall Thickness (Optional)

Enter the inner wall thickness for the port.

Seating or Groove or Socket Depth (Required)

Enter the depth of socket for the port. Include the units of measure, such as **mm** or **in**, when specifying this value.

Schedule Practice (Optional)

Select the schedule practice for the port.

Schedule Thickness

Enter the value or code that represents the schedule (or thickness) for the conduit port.

Termination Class (Required)

Select the termination class.

Termination Sub Class (Required)

Select the termination sub class for the port.

Wall Thickness or Groove Setback (Optional)

Enter the wall thickness at the port. Make sure that you enter this value with full precision (0.3125, not 0.312). If you do not specify a value here, the software calculates the wall thickness as the outside diameter minus the inside diameter divided by two. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

See Also
Standard Nozzle Data (on page 246)

Piping Elbow Nozzles

The **Piping Elbow Nozzles** defines reference data for piping elbow nozzles.

Bend Radius

Type the bend radius value and units for the piping nozzle.

Bend Length

Type the bend length value and units for the piping nozzle.

The following picture shows the **Bend Radius** and **Bend Length** dimensions on a piping elbow nozzle.

End Practice (Required)

Select the end practice for the piping port. The end practices are defined in the End Standard select list.

End Preparation (Required)

Select the end preparation for the piping port. The end preparations are defined in the End

Preparation select list.

End Standard (Required)

Select the end standard for the piping port. The end standards are defined in the End Standard select list.

Flange or Hub Outside Diameter (Required)

Enter the flange's outside diameter for the piping port. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange or Hub Thickness (Required)

Enter the distance from the outermost flange face to the back surface of the flange on which the nut rests. Include any projections that the flange may have, such as a raised face, only if the manufacturer's data includes any projections or if specified by the standard. The flange thickness should include the thickness of the loose flange used, but not include the wall thickness of the pipe or stub end for lap-flanged ends.

Flange or Mechanical Groove Width (Required)

Enter the groove width of the conduit, if applicable to groove flanged ends. This value is required to compute the gasket outside diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange Projection or Socket Offset (Required)

Enter the width of any projections that the flange may have, such as raised faces. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flow Direction (Required)

Select the flow direction for the port. Specifying the correct flow direction code for each part port is very important because the software automatically orients the part to the flow direction of the piping or port to which the part is connected.

Internal ID

Not used.

Liner Thickness at Face of Flange (Required)

Specify the thickness of the lining material at the face of the flange at any field-lined bolted fittings.

Liner Thickness at Inside Diameter (Required)

Specify the thickness of the lining material at the inside diameter of field-lined fittings.

Nominal Size

Type the nominal piping diameter for the piping nozzle.

Npd Unit Type

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping Inside Diameter (Optional)

Enter the inside diameter at the port. If you do not specify a value here, the software calculates the inside diameter as the outside diameter minus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Piping Outside Diameter (Optional)

Enter the outside diameter at the port. If you do not specify a value here, the software calculates the outside diameter as the inside diameter plus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value.

Piping Point Basis (Required)

Select the function of the port.

Port ID

Enter a description of the port.

Port Index

Enter the port index number.

Pressure Rating (Required)

Select the pressure rating.

Raised Face or Socket Diameter (Optional)

Enter the raised-face diameter of the port, if applicable to raised- face flanged ends. This property also applies to the diameter of small male flange faces and large male flange faces. This value is required to compute the gasket outside diameter and the gasket inside diameter. This column is also used to enter the socket or thread diameter of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Reinforced Wall Thickness (Optional)

Enter the inner wall thickness for the port.

Schedule Practice (Optional)

Select the schedule practice for the port.

Schedule Thickness (Optional)

Select the schedule (or thickness) for the piping port.

Seating or Groove or Socket Depth (Required)

Enter the depth of socket for the port. Include the units of measure, such as **mm** or **in**, when specifying this value.

Termination Class (Required)

Select the termination class.

Termination Sub Class (Required)

Select the termination sub class for the port.

Wall Thickness or Groove Setback (Optional)

Enter the wall thickness at the port. Make sure that you enter this value with full precision (0.3125, not 0.312). If you do not specify a value here, the software calculates the wall thickness as the outside diameter minus the inside diameter divided by two. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

See Also
Standard Nozzle Data (on page 246)

Piping Straight Nozzles

The **Piping Straight Nozzles** node defines reference data for piping straight nozzles.

End Practice (Required)

Select the end practice for the piping port. The end practices are defined in the End Standard select list.

End Preparation (Required)

Select the end preparation for the piping port. The end preparations are defined in the End Preparation select list.

End Standard (Required)

Select the end standard for the piping port. The end standards are defined in the End Standard select list.

Flange or Hub Outside Diameter (Required)

Enter the flange's outside diameter for the piping port. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange or Hub Thickness (Required)

Enter the distance from the outermost flange face to the back surface of the flange on which the nut rests. Include any projections that the flange may have, such as a raised face, only if the manufacturer's data includes any projections or if specified by the standard. The flange thickness should include the thickness of the loose flange used, but not include the wall thickness of the pipe or stub end for lap-flanged ends.

Flange or Mechanical Groove Width (Required)

Enter the groove width of the conduit, if applicable to groove flanged ends. This value is required to compute the gasket outside diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange Projection or Socket Offset (Required)

Enter the width of any projections that the flange may have, such as raised faces. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flow Direction (Required)

Select the flow direction for the port. Specifying the correct flow direction code for each part port is very important because the software automatically orients the part to the flow direction of the piping or port to which the part is connected.

Internal ID

Type a description of the nozzle.

Liner Thickness at Face of Flange (Required)

Specify the thickness of the lining material at the face of the flange at any field-lined bolted fittings.

Liner Thickness at Inside Diameter (Required)

Specify the thickness of the lining material at the inside diameter of field-lined fittings.

Nominal Size

Type the nominal piping diameter for the piping nozzle.

Npd Unit Type

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping Inside Diameter (Optional)

Enter the inside diameter at the port. If you do not specify a value here, the software calculates the inside diameter as the outside diameter minus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Piping Outside Diameter (Optional)

Enter the outside diameter at the port. If you do not specify a value here, the software calculates the outside diameter as the inside diameter plus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value.

Piping Point Basis (Required)

Select the function of the port.

Port ID

Enter a description of the port.

Port Index

Enter the port index number.

Pressure Rating (Required)

Select the pressure rating.

Raised Face or Socket Diameter (Optional)

Enter the raised-face diameter of the port, if applicable to raised- face flanged ends. This property also applies to the diameter of small male flange faces and large male flange faces. This value is required to compute the gasket outside diameter and the gasket inside diameter. This column is also used to enter the socket or thread diameter of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Reinforced Wall Thickness (Optional)

Enter the inner wall thickness for the port.

Schedule Practice (Optional)

Select the schedule practice for the port.

Schedule Thickness (Optional)

Select the schedule (or thickness) for the piping port.

Seating or Groove or Socket Depth (Required)

Enter the depth of socket for the port. Include the units of measure, such as **mm** or **in**, when specifying this value.

Termination Class (Required)

Select the termination class.

Termination Sub Class (Required)

Select the termination sub class for the port.

Wall Thickness or Groove Setback (Optional)

Enter the wall thickness at the port. Make sure that you enter this value with full precision (0.3125, not 0.312). If you do not specify a value here, the software calculates the wall thickness as the outside diameter minus the inside diameter divided by two. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Label Editor Command

Specifies a label template. This command is available only on the **Tools** menu in the **Catalog** task.

Editing Labels

You can also use this command to edit the definition of an existing label. To edit an existing label, select the label and click **Edit Label** ⊠. When the **Label Editor** dialog box appears, you can edit the label definition as needed. However, some labels have read-only definitions:

- The query is read-only. If the label uses a COM query or a VB query, the query is non-editable.

- The format layout is read-only. If the COM query returns coordination data such as position or orientation, the label format is non-editable. If the format uses NPDDEF or NPD properties, it is non-editable. If there is conditional formatting or if the format runtime action is not **RTFLabel**, the format is non-editable.

- Both the query and layout are read-only.

For more information on label definition, see the *Intergraph Smart™ 3D Programmer's Guide*. For further assistance, contact Intergraph Support Services. You can find support information on our web site http://support.intergraph.com.

Using the **Label Editor** functionality, you can create and modify object labels, which are mini-reports. You can use the **Label Editor** to create label definitions for parts, coordinates, tooltips, reports, drawing borders, and drawing view borders.

You can specify several label characteristics, including:

- Content of the label (properties from the object model in the software)

- Font and font style

- Formats of values

- Units of measure

Define Label Dialog Box

Provides options for creating a new label or for editing an existing label. The **Labels** node is the top-level folder in the navigation pane on the left-side of the window. Subfolders contain the various labels that have been defined in the Catalog database.

Permission Group

Select the permission group to which the label belongs. Permission groups are defined in Project Management.

New Folder

Creates a new folder named **New Folder** under the selected node in the hierarchy. By default, the software allows you to immediately type a new name for the folder. You can keep the default **New Folder** name by clicking elsewhere in the dialog box.

New COM Label

Opens the *Label Editor Command* (on page 256). By default, the columns are populated with the properties appropriate for this label type.

New SQL Label

Opens the *Label Editor Command* (on page 256) in SQL mode. Because the properties for an SQL label are the result of a user-defined query, the columns are not populated with data.

Edit Label

Opens the *Label Editor Command* (on page 256) so you can edit the definition for the selected label.

Delete

Removes the selected node or label (subject to the level of access permissions for the user).

Rename

Renames the selected node or label (subject to the level of access permissions for the user).

Properties

Opens the *Label Editor Command* (on page 256) and displays the properties for the selected label.

List View

Displays the report documents (labels) on the right in a standard list format, as shown in the following illustration:

Name	Description
Equipment Combined ...	DryWeight and Wet.
Equipment Dry Weight	Weight
Equipment Insulation ...	Equipment Insulatior
Equipment Nozzle Lo...	Location for nozzles
Equipment Nozzle NPD	Primary Size
Equipment Nozzle Ori...	Orientation for nozzle
Equipment Occurrenc...	Location
Equipment Vessel Oc...	Location in X (East)
Equipment Vessel Oc...	Location in Y (North)
Equipment Vessel Oc...	Location in Z (Up)

Grid View

Displays the report documents (labels) on the right in a standard grid format, as shown in

the following illustration:

Name

Specifies the name of the label.

Description

Describes the label.

Type

States the type of label (for example, **Label Template**). For more information, refer to the discussion of report and label templates in the *Drawings and Reports* documentation.

Close

Closes the dialog box.

Label Editor

Edits or creates a label. This dialog box is accessible from **Tools** > **Define Label** in the Catalog task dialog box; it displays when you click **New COM Label** ▤, **New SQL Label** ⊞, or **Properties** ▦ on the horizontal toolbar.

☰ NOTES

- In the Common task, the Label Editor displays when you select a Tooltip on the **OptionsToolTips** tab and then click **Edit Label**. You can edit the formatting for the selected label, and the changes are saved to the session file. Edits made to the label are not saved to the Catalog. For more information, see the *Common User's Guide.*

- In the Drawings and Reports task, the Label Editor displays when you select **New Format** in the **Name** list on the **Labels** tab of the **Item Properties** dialog box when using **Design Layout** to format a report. You can create a new label format to use within your report. For more information, see the *Reports User's Guide* and the *Drawings and Reports Reference Data Guide.*

Name

Displays a default name for the label. You can type a name, or click **More** to select an existing label definition. In the Common task, this box is not available.

Description

Displays a text description of the label.

Properties

Displays properties associated with the label. The options available are different depending on the type of label--either COM or SQL Query. If you are working with a **COM Label**, you can add or delete property rows as needed:

Add

Opens the **Select Properties** dialog box, from which you can select an object type and corresponding property. For more information about this dialog box, see the section about managing sessions in the *Common User's Guide* available from the **Help > Printable Guides** command in the software.

Remove

Discards a selected property in the **Properties** grid.

Edit Label

Opens the Select Properties Dialog Box to apply object properties to the label definition.

Property Name

Specifies the name of the property.

Alias Name

Specifies an alias for the property. You can type user-defined text in this box.

If you are working with an **SQL Query Label**, the definition provides the following capabilities:

- **Show Results** - Adds a results pane to the Properties section. The results update when you execute the query.

- **Execute Query** - Runs the query as specified. If the Results pane is shown, the results display.

- **Properties** - Displays the **Select Properties** dialog box.

- **Name** - Specifies a name for the query.

Layout

Provides a text field for entering text and fields to be used in the label. The options available are described as follows:

Rich Text Format

Displays the **Font** dialog box so that you can specify font, font style, font size, and font special effects to be used in the label.

Block Definition

Displays the **Block** dialog box so that you can define condition criteria. For more information, see Block Definition Dialog Box (Label Editor).

Field Formatting

Displays the **Field Formatting** dialog box so that you can define specific formatting for a selected field. This button is disabled unless a field is selected in the Layout text box. For more information, see Format Field Dialog Box (Label Editor).

Unit Formatting

Displays the **Select Rule** dialog box for specifying a Unit of Measure formatting rule. This button is disabled unless a unit of measure field is selected in the Layout text box. For more information, see Select Rule Dialog Box (Label Editor - Unit of Measure).

Position Definition

Displays the **Position Definition** dialog box for defining the displays of the positional information in the label. This button is disabled unless a positional field is selected in the Layout text box. For more information, see Position Definition Dialog Box.

Orientation Definition

Not available in this version.

Format Field Dialog Box (Label Editor)

Defines the format for the selected field. The **Format Field** dialog displays when you select a field in the Layout text box on the **Label Editor** and click **Format Field** . The dialog box is similar to the Microsoft Excel **Format Cell** command.

Category

Specifies the type of the formatting to assign to the field. The category controls the definition controls displays on the dialog box.

Sample

Shows a sample of the selected format.

Select Rule Dialog Box (Label Editor - Unit of Measure)

Lists the available unit of measure rules. You can open this dialog box when you select a single field in the Layout text box on the **Label Editor** box and click **Format Unit** .

Rule Name

Lists the names of available unit of measure rules.

Description

Lists the descriptions of the rules.

New

Displays the **Unit of Measure** dialog box for creating a new unit of measure rule. For more information, see Unit of Measure Dialog Box (Label Editor).

Delete

Deletes the selected rule.

Rename

Renames the selected rule.

Properties

Displays the **Unit of Measure** dialog box to review or edit the selected rule.

Unit of Measure Dialog Box (Label Editor)

Specifies properties for a new unit of measure rule. This dialog box displays when you click **New** on the **Select Rule** dialog box. The properties displayed are inherited from the context in which the unit of measure label is created (that is, Session, Report, or Drawing).

Rule Name

Specifies a name for the unit of measure rule.

Description

Describes the unit of measure rule.

Inherit from Session, Reports, Drawing

Indicates that the parameter should use the same units used in the session, the report, or the drawing. This option is selected by default, which makes the **Properties** read-only.

📝 **NOTE** To change the existing values, clear this option. You can then define a value for the **Unit Delimiter** property.

Properties

Unit

Displays the type of unit, such as distance.

Primary

Specifies the primary unit of measure, such as yards in yards, feet, or inches.

Secondary

Specifies the secondary unit of measure, such as feet in yards, feet, or inches.

Tertiary

Specifies the tertiary unit of measure, such as inches in yards, feet, or inches.

Displayed Unit

Turns the display of the units on and off.

Precision Type

Specifies **Decimal**, **Fractional**, or **Scientific**. Your selection in this box determines the availability of the remaining boxes on this dialog box.

Decimal Precision

Specifies the number of places after the decimal point. This value can be 0 or greater.

Leading Zero

Places a zero before the decimal point, if applicable.

Trailing Zeros

Places zeros after the last significant digit, if applicable.

Fractional Precision

Specifies a fraction for the precision. The highest value that you can specify is 1/2. This box is available only if you select **Fractional** in the **Precision Type** box.

Reduce Fraction

Reduces the fraction. For example, displays 3/4 instead of 6/8. This box is available only if you select **Fractional** in the **Precision Type** box.

Unit Delimiter

Specifies the unit delimiter that you want to add between primary and secondary units in a report label. For example, 4'-3 3/4". This box is disabled if you leave the secondary unit as <BLANK> or if **Inherit from Session, Reports, Drawing** option is selected.

📝 NOTES

- If you do not set the unit delimiter value, the software places two space characters between the primary and secondary units.

- You can define one unit delimiter value.

- If you want spaces between the units and the unit delimiter, add spaces to the unit delimiter value, such as "-".

Block Definition Dialog Box (Label Editor)

Displays several options that allow you to apply condition criteria to new or existing labels. A conditional label only appears if the conditions are met based on the values specified in the **Block Definition** dialog box.

Selected block text

Displays the selected block of text from the **Layout** section of the **Label Editor** command. For more information, see *Label Editor Command* (on page 256).

Block type

Repeat the fields in the block for each occurrence

Allows you to repeat certain fields in the block as many times as they occur in the label. Text in this box cannot be edited. For example, most label blocks are separated by a return in the label, but the repeat option places all of the conditional blocks on the same line in the label.

Conditions

Match all

All conditions must match.

Match any

Any conditions can match.

True

Condition must be true.

False

Condition must be false.

✕ **Delete**

Removes the selected row from the list of conditions.

Property

Specifies the properties available from the **Layout** field in the **Label Editor**.

Operator

Specifies the operator value. Possible values are: **=**, **>**, **>=**, **<**, **<=**, **<>**, **Between**, and **Not Between**.

Value

Specifies the properties available for comparison based on the properties list.

NOTE If Boolean or codelist values exist, they are also listed for comparison.

State of value

Specifies the format, which can be Raw, Post-formatted, and Pre-formatted.

Value 2

Specifies the second value condition if the **Operator** is set to **Between** or **Not Between**.

Position Definition Dialog Box

Defines position information for a new label field. This dialog box displays when you select a positional field in the Layout text box on the **Label Editor** and click **Define Position** .

Properties

Displays a list of the properties currently assigned to the positional field. For example, you select the label text field **<F>CGx</F>** and you want to represent the value as **5.45m GlobalCS East**. You would need to define the coordinate system, the name of the +/- axes, and the read-out order for the values.

The **Matrix Rule** property provides a dropdown list of the last 10 selected rules. Selecting **Create New Rule** in the dropdown allows you to create a new positional definition rule. For more information on creating a new positional rule, see Matrix Rule Dialog Box. Selecting **More** in the dropdown displays a **Browse** dialog to select an existing rule. For more information on selecting an existing rule, see Select Rule Dialog Box (Label Editor - Position Definition).

NOTE The **Readout** property has a dropdown that contains all of the possible combinations for value, coordinate system, and axis, including cases where you might want to omit one of the read-out options.

Select Rule Dialog Box (Label Editor - Position Definition)

Lists the available position matrix rules. You can open this dialog box when you select **More** in the **Matrix Rule** list on the **Position Definition** dialog box.

Rule Name

Lists the names of available position matrix rules.

Description

Lists the descriptions of the rules.

New

Displays the **Matrix Rule** dialog box for creating a position matrix rule. For more information, see Matrix Rule Dialog Box.

✕ Delete

Deletes the selected rule.

a|e Rename

Renames the selected rule.

⬚ Properties

Displays the **Unit of Measure** dialog box to review or edit the selected rule.

Matrix Rule Dialog Box

Specifies properties for a position matrix rule. This dialog box displays when you click **New** ⬚ on the **Select Rule** dialog box.

Rule Name

Specifies a name for the unit of measure rule.

Description

Describes the unit of measure rule.

What do you want to do?

- *Create a Label* (on page)
- *Modify Label Symbol File* (on page)
- *Modify Label XML File* (on page)
- *Create a New Label Rule* (on page)
- *Define the Unit of Measure* (see "*Create a Label*" on page)

Create a Label

1. In the **Catalog** task, click **Tools > Define Label**.

2. On the **Define Label** dialog box, select the type of label you want to create - **New COM Label** ▤ or **New SQL Label** ⬚.

3. In the **Label Editor**, type a name in the **Name** box, if necessary.

4. Type a new description in the **Description** box, if necessary.

5. For property-based labels, add properties to the label by clicking **Add** and selecting the object type and properties you want to include in the label in the **Select Properties** dialog box.

6. Select rows in the **Properties** table, and click **Insert a field to layout** to place them in the **Text** region.

7. To change the font style for a property, select a field in the **Text** box, and click **Rich Text Formatting** ⁴A.

8. To change the format of a property, select a field in the **Text** box, and click **Field Formatting** .

9. To change the format of the units of measure, select a field in the **Text** box, and click **Unit of Measure** . For more information, see *Define the Unit of Measure* section.

10. For SQL-based labels, make changes to the SQL statements in the **Properties** box. You can click **Show Results Pane** to open a lower window that displays the results of the SQL query. Test the query by clicking **Execute Query** ▶.

11. When you are finished, click **OK**.

Define the Unit of Measure

1. In the **Label Editor** dialog box, select the label text in the **Layout** box and click **Unit of Measure** .

   *The **Select Rule** dialog box displays.*

2. Click **New** or **Properties** .

   *The **Unit of Measure** dialog box displays.*

3. Clear **Inherit from Session, Reports, Drawings** check box, if you want to change the existing values and to type in a unit delimiter value.

4. Define values for **Primary** and **Secondary** units.

5. Type a value in the **Unit Delimiter** box. For more information, see *Unit of Measure Dialog Box (Label Editor)* in the *Label Editor Command* section.

6. Click **OK**.

NOTE If you define a label with a unit delimiter, then you can find the .rfp file of the respective label template in the *[Product Folder]\3DRefData\SharedContent\Labels\Types of Labels* folder. For example, if you change the UOM (unit of measure) setting of Structure Linear Member Length, then the .rfp file of Structure Linear Member Length is changed. Every label has its own .rfp file.

Modify Label Symbol File

This workflow demonstrates the ability to further modify a label by creating the symbol file.

1. Using Windows Explorer, browse to the location that you saved the label created with the Label Editor.

   TIP The default location is *[Product Folder]\SharedContent\Labels\Drawing Labels.*

2. Copy all of the files associated to the new label you created. There are four files with different extensions: RFM, RFP, RQE, and RTP.

3. Browse to *[Product Folder]\SharedContent\Drawings\Catalog\Labels\Templates,* and paste the files.

4. In the Templates folder, perform a copy and paste operation of an existing SYM file. For example, copy and paste **SectionSize_None_APO_NL.sym** in the same folder.

5. Rename the copied file to match the files you created earlier in the Label Editor.

6. Double-click the new SYM file to open it.

7. Change the text in the Text box to match the label name.

8. Right-click the text box, and select **Properties**.

9. On the **User** tab, change the **Value** field to the name of your label.
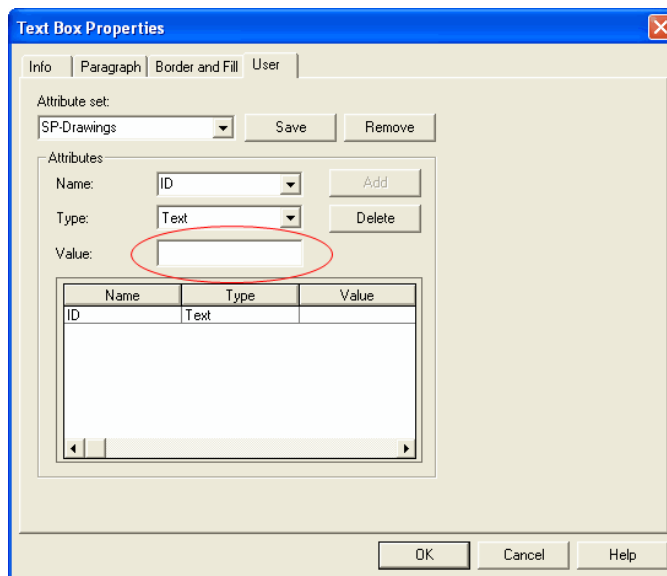
For more information on editing other symbol properties, see the *Orthographic Drawings User's Guide*.

10. Click **Add** to add the label ID to the symbol properties.

11. Click **OK**.

   The symbol file is associated to the new label you created in the Label Editor.

Modify Label XML File

This workflow demonstrates the ability to further modify a label by editing the associated XML file.

1. Browse to the *[Product Folder]\SharedContent\Drawings\Catalog\Labels\Templates* folder.

2. In the Templates folder, perform a copy and paste operation on an existing XML file. For example, copy and paste **SectionSize_None_APO_NL.xml** in the same folder.

3. Rename the copied file to match the files you created earlier in the Label Editor.

   TIP Before proceeding, consider downloading a third-party XML document editor to make it easier to read and modify the .xml files.

4. Double-click the new XML file to open it in Notepad or a third-party XML document editor.

5. Rename any instances of **SectionSize_None_APO_NL** to your new label name. For example, rename **SectionSize_None_APO_NL** to **MyNewLabel**.

   NOTE When renaming these instances, remember to keep file extensions if they are present in the original name.

6. Save the file and exit.

   NOTE In order to use your new label in a drawing, you need to create a label rule. For more information on creating a new label rule, see *Create a New Label Rule* (on page 267).

See Also
Modify Label Symbol File (on page 266)

Create a New Label Rule

This workflow demonstrates the ability to create a new label rule that can be used to place a custom label that you have created.

1. Browse to the [Product Folder]\SharedContent\Catalog\Rules\LabelRules folder, and perform a copy and paste operation on an existing XML file. For example, copy and paste the **SectionSize_None_APO_NL.xml** file within the same folder.

2. Rename the copied XML file to the name of the label you created in previous steps.

3. Open the file using Notepad or a third-party XML document editor.

4. Change any occurrences of **SectionSize_None_APO_NL** to your label name. For example, change **SectionSize_None_APO_NL** to **MyNewLabel**.

   TIP There should only be one file name to change in this XML file.

5. Save the file and exit.

6. In order to use your new label in a drawing, you need to specify the new rule within a particular view style. For more information, see the *Orthographic Drawings User's Guide.*

See Also
Modify Label Symbol File (on page 266)
Modify Label XML File (on page 267)

Appendix: Best Practices - Reference Data and Catalog Change Management

When you are modeling in a project, you must make changes to the catalog or reference data in the correct order to avoid modeling errors causing project delay and cost overrun. This section provides best practices guidance on how to manage changes to the Smart 3D catalog and reference data during a project. To narrow the scope on this subject, this section does not include the benefits of using SmartPlant Reference Data (SPRD) to manage corporate specifications in a global environment. The general procedure includes management of specification data, symbol definition, rules, and parts data, as well as required catalog schema changes to support the life cycle phases of a project.

Terminology
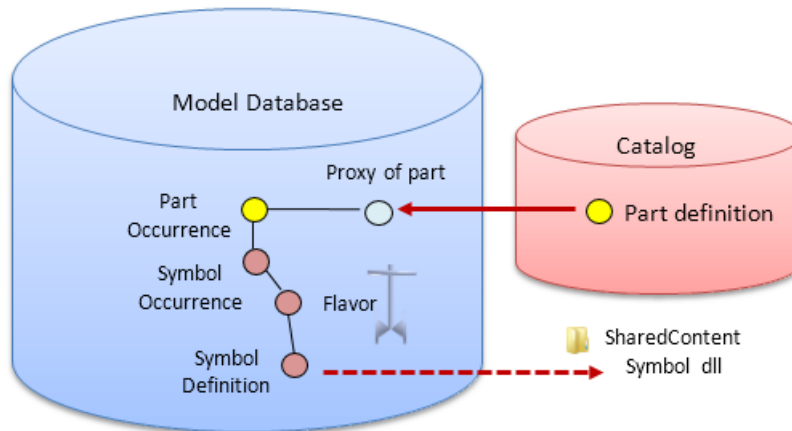
Flavor

Holds and caches the actual graphical representation of the object.

Part definition

An object in the catalog database that contains part data.

Part occurrence

An instance of a part in the model database.

Proxy

A representative of an object from another database.

Symbol

An application programming interface (API) .dll file that creates a set of outputs for a given set of inputs.

Symbol definition

An object in the model database that defines the inputs and outputs used to create the graphical representation of the object.

Symbol occurrence

An object with specific values for the parameter of a flavor.

Unique ID Definition

A unique string created from a combination of rule properties that defines the uniqueness of catalog object.

Object	Unique Properties
Piping Commodity Matl Control Data	ContractorCommodityCode, FirstSizeFrom, FirstSizeTo, FirstSizeUnits, SecondSizeFrom, SecondSizeTo, SecondSizeUnits
Unique ID Definition	VAAAHAAAWAIFABACFZZUS, ,

Catalog Task

Do not use the Catalog task to make changes to the catalog database, as no easy mechanism exists for exporting your changes from the catalog database back into a Microsoft Excel workbook.

Tools

This section describes all the major tools and commands used to manage catalog and reference data changes.

Bulkload Utility

Bulkload allows you to load changes from spreadsheets into the catalog database. Select **Add, modify, or delete records in existing catalog** to modify existing data in the catalog. For more information, see *Bulkload Utility* in the *Smart 3D Reference Data Guide*.

Verify Consistency Report Command

Tools > Verify Consistency Report checks the piping specification rules and the required data to place the part occurrences. After the consistency check completes, the software generates a report detailing the discrepancies. For more information, see *Verify Consistency Report*

Command (on page 204) under *Piping Reference Data > Consistency between Piping Specification and Catalog Data* in the *Catalog User's Guide*.

Catalog Checker Utility

Catalog Checker assesses how changes made to the specification rules and part data in the catalog impact the 3D model. For more information, see the Smart 3D Customer Support Site under the Freeware Tools and Utilities web page at https://smartsupport.intergraph.com.
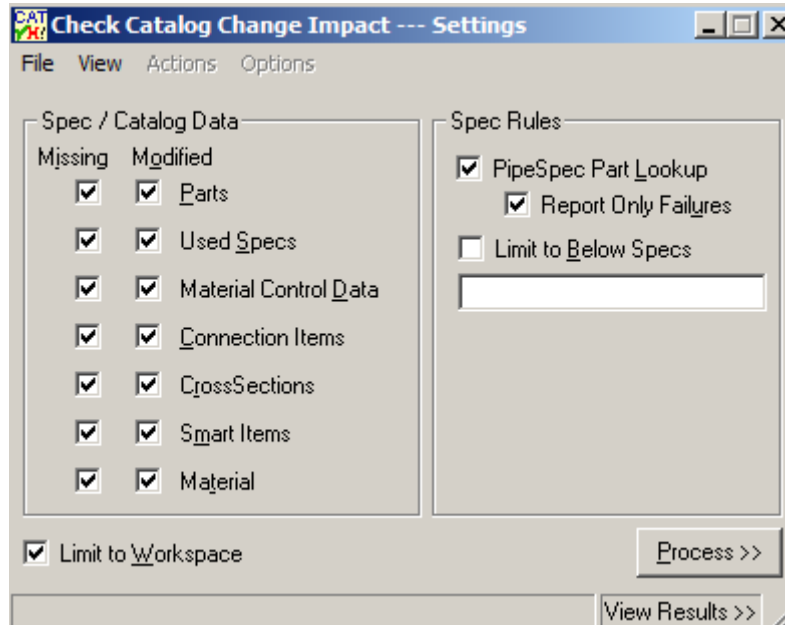
Synchronize Model with Catalog Command

Synchronize Model with Catalog updates all objects in the model database with all catalog changes, such as part definition, specification, rules, and symbol definition changes. For example, in a GWS configuration, you need to update the **To Do List** with items at satellite locations. We recommend that you select **Mark out-of-date occurrences** as shown below. For more information, see *Synchronize Model with Catalog* in the *Smart 3D Project Management User's Guide*.
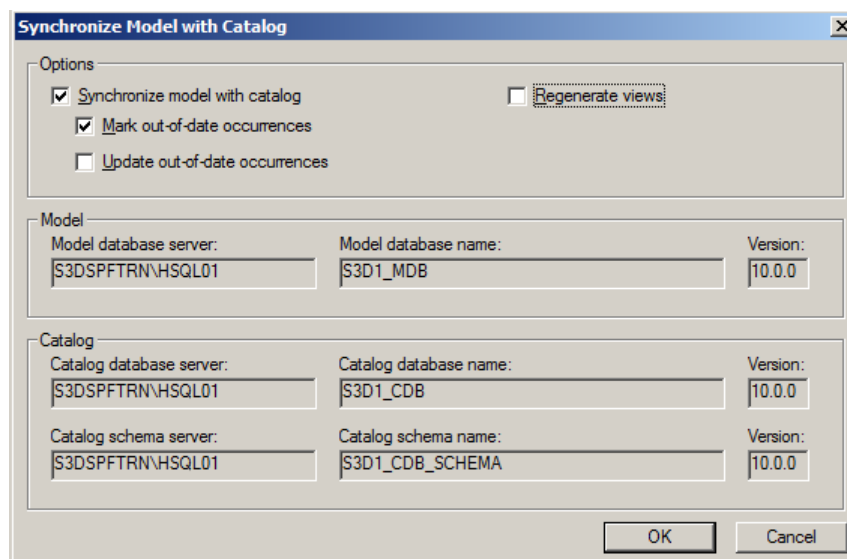
Synchronize Workspace Command

Synchronize Workspace updates selected out-of-date objects in the model with all changes from the catalog. If no objects are selected, then the command searches and updates all out-of-date objects in the workspace. You access this command by selecting **Tools > Utilities > Synchronize with Catalog**. For more information, see *Synchronize Workspace* in the *Smart 3D Project Management User's Guide*.
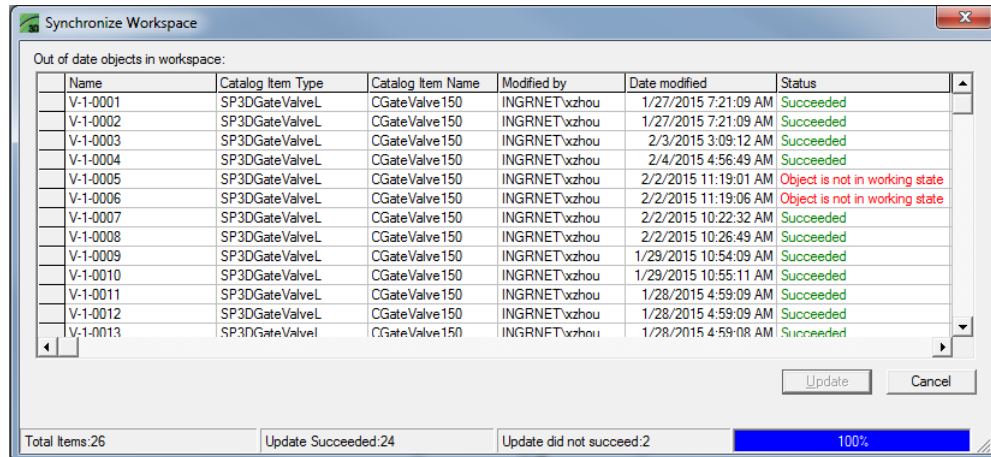
To Do List

To Do List shows objects in the workspace that have inconsistent data. The **Note** column describes the problem. Select **View > To Do List** in any modeling task to run the command. For more information, see the *Smart 3D Common User's Guide*.
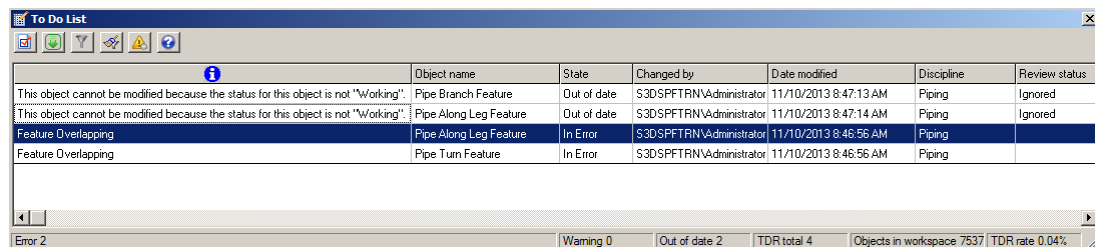
Update Custom Symbol Configuration Command

Update Custom Symbol Configuration updates the CustomSymbolConfig.xml file, which contains the ProgID, CLSID, and dll name for each custom symbol. Smart 3D uses this file to find the symbol dll when the software creates the symbol definition object for the first time in the model database. Select **Tools > Update Custom Symbol Configuration** in the **Project**

Management task to run this command. For more information, see the *Smart 3D Common User's Guide*.
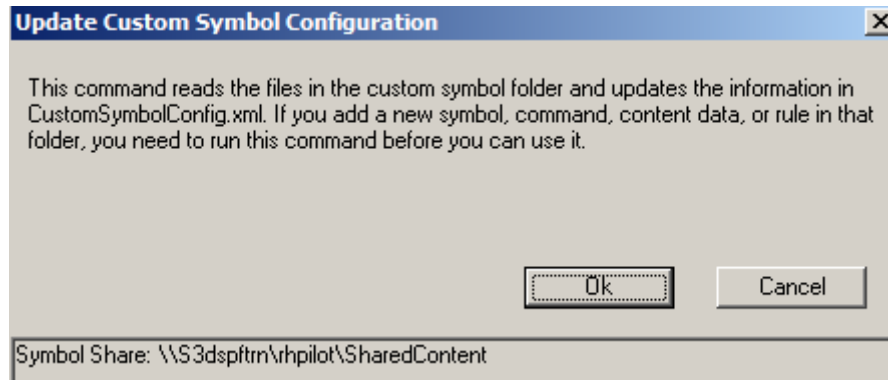
Smart 3D Schema Browser

Smart 3D Schema Browser allows you to check the success of an intended schema change and diagnose problems with the catalog schema. This tool is located at [Product Directory]\Core\Tools\Administrator\Bin\MetaDataBrowser.exe.
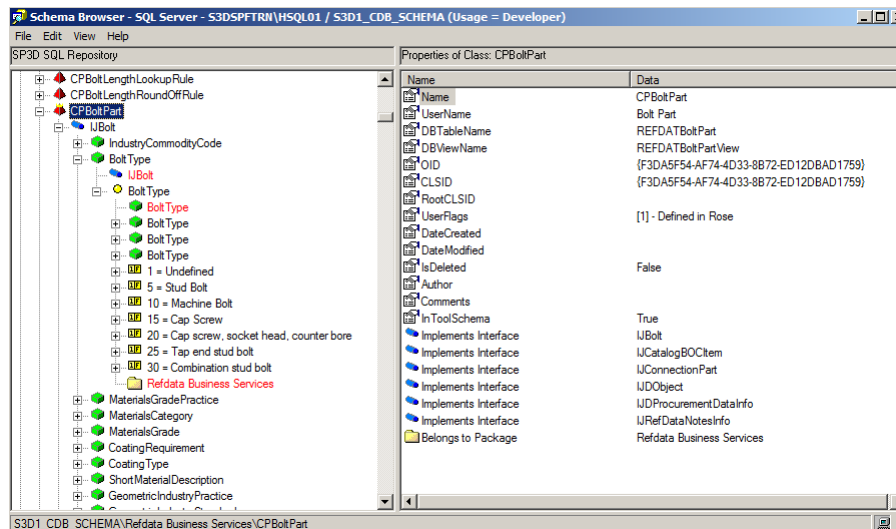
Procedures

Changes to the catalog and reference data are grouped into the following categories.

Reference data changes

Reference data changes refer to data used to define the part definition, specifications, and other reference data rules for placing the part occurrences. To change the reference data, we recommend the following procedures:

Add a new record

1. Open the spreadsheet in which you want to create a new record.

2. At the beginning of the new record entry, type **A**.

3. Bulkload the spreadsheet, and then review the log file.

4. Use **Verify Consistency** to resolve any discrepancies.

Edit an attribute

1. Open the spreadsheet in which you want to modify the attribute.

2. If you are modifying an occurrence attribute, type **M** at the beginning of the record, and then edit the attribute. Then, bulkload the spreadsheet, update the impacted objects, and verify your changes.

3. If you are not modifying an occurrence attribute, determine if the attribute is used in the unique identification of the record. If it is, copy the record, type **D** at the beginning of the first record and **A** at the beginning of the second record, and then edit the second record. If it is not, type **M** at the beginning of the record, and then edit the attribute.

4. Bulkload the spreadsheet, and then review the log file.

5. Run **Catalog Checker** to review the impact of deleting the record. If there is not an impact on the geometry or the topology of the modeled objects, skip to step 8.

6. Use **Synchronize Model with Catalog** to mark out-of-date occurrences.

7. Use **Synchronize Workspace** to update the impacted objects, then skip to step 9.

8. Use **Synchronize Model with Catalog** to mark out-of-date occurrences at the host and at all satellites.

9. Verify your changes, and resolve any discrepancies.

Delete a record

1. Open the spreadsheet in which you want to delete a record.

2. At the beginning of the record to delete, type **D**.

3. Bulkload the spreadsheet, and then review the log file.

4. Run **Catalog Checker** to review the impact of deleting the record. If there is not an impact on the geometry or the topology of the modeled objects, skip to step 7.

5. Use **Synchronize Model with Catalog** to mark out-of-date occurrences.

6. Use **Synchronize Workspace** to update the impacted objects, then skip to step 8.

7. Use **Synchronize Model with Catalog** to mark out-of-date occurrences at the host and at all satellites.

8. Verify your changes, and resolve any discrepancies.

🗐 NOTES

- Names such as UserClassName, OccClassName, ObjectName, SpecName, and PartNumber must be unique when compared to each other within a class *and* across the entire catalog.

- For more information on unique ID definitions, see *GUIDs Sheet* in the *Smart 3D Reference Data User's Guide*.

Symbol definition changes

Changes to symbol definitions affect RAD 2D symbols, .NET/Visual Basic symbols, and Solid Edge files used to define the graphical representation of the part occurrences.

Catalog schema changes

Catalog schema changes affect data used to define the classes, interfaces, and properties for part definitions and part occurrences.

Other changes

You can also make smart occurrence rule changes and naming rule changes to the catalog and reference data.

Examples of Piping Component Data Changes

In this section, we will show some example workflows for editing all aspects of a piping component in the catalog. These examples will ensure that you are aware of the necessary steps to perform the catalog changes, and that you understand the effect synchronization has on the model. As a result, you can decide whether the catalog changes are safe. This section shows you how to determine what changes you need to make to the spreadsheet to apply the catalog changes with the **Bulkload** utility.

Edit the Contractor Commodity Code in the Piping Commodity Filter Sheet

The contractor **Commodity Code** in the **Piping Commodity Filter** rule is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the new requirement needs to state that the 1C0031 specification needs a new default contractor commodity for the 0.75 inch to 1.5 inch size range.

1. Open the **Piping Commodity Filter** sheet.

2. Locate the record, edit the **Commodity Code** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Because editing the **Commodity Code** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

5. Use **Synchronize Workspace** to update the objects.

6. Verify your changes, and resolve any discrepancies.

⚠ **CAUTION** The corresponding piping part definition and the material control data for the new contractor commodity code must exist in the catalog.

Add an Optional Short Code in the Piping Commodity Filter Sheet

You can add an optional piping commodity code to the **Piping Commodity Filter** rule. For example, the new requirement dictates that the 1C0031 pipe specification needs an optional gate valve for the 0.75 inch to 1.5 inch size range.

1. Open the **Piping Commodity Filter** sheet.

2. Locate the record, edit the **Commodity Code** value, and then type **A** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Verify your changes, and resolve any discrepancies.

⚠ **CAUTION** The corresponding piping part definition and the material control data for the new optional contractor commodity code must exist in the catalog.

Edit the Nominal Pipe Diameter Range in the Piping Commodity Filter Sheet

The nominal pipe diameter range in the **Piping Commodity Filter** rule is used to create the unique ID definition of the record. Therefore, you must remove the existing record from the catalog by typing **D** at the beginning of the record. Then, you add a new record with the changes. For example, the new requirement dictates that a 4 inch butterfly valve must be available for the 1C0031 pipe specification.

1. Open the **Piping Commodity Filter** sheet.

2. Locate and copy the record.

3. Type **D** at the beginning of the first record.

4. Edit the second record, and then type **A** at the beginning of the record.

5. Bulkload the spreadsheet, and review the log file.

6. Use the **Catalog Checker** to review the impact of your proposed changes.

7. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Verify your changes, and resolve any discrepancies.

⚠ **CAUTION** The corresponding piping part definition and the material control data for the new optional contractor commodity code must exist in the catalog.

Edit the Maximum Temperature in the Piping Commodity Filter Sheet

The **Maximum Temperature** attribute in the **Piping Commodity Filter** rule is used to create the unique ID definition of the record. Therefore, you must remove the existing record from the catalog by typing **D** at the beginning of the record. Then, add a new record with the changes. For example, the new requirement dictates that you can place small ball valve sizes in the 1C0031 pipe specification if the pipe run maximum temperature is less than or equal to 400 degrees F.

1. Open the **Piping Commodity Filter** sheet.

2. Locate and copy the record.

3. Type **D** at the beginning of the first record.

4. Edit the **Maximum Temperature** of the second record, and then type **A** at the beginning of the record.

5. Bulkload the spreadsheet, and review the log file.

6. Use the **Catalog Checker** to review the impact of your proposed changes.

7. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Verify your changes, and resolve any discrepancies.

Edit the Dimensional Parameter in the User Defined Part Class Sheet

The **Dimensional Parameter** is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the new requirement dictates that the face-to-face dimension value is 8 inches for a 3 inch 150# gate valve with a contractor commodity code "VAAAHAAAWAIFABAZZZZUS".

1. Open the **User Defined Part Class** sheet.

2. Locate the record, edit the **Dimensional Parameter** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Because editing the **Commodity Code** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Use **Synchronize Workspace** to update the objects.

7. Verify your changes, and resolve any discrepancies.

Edit the Dry Weight in the User Defined Part Class Sheet

The **Dry Weight** attribute is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct dry weight is 65 pounds for a 3 inch 150# gate valve with a contractor commodity code "VAAAHAAAWAIFABAZZZZUS".

1. Open the **User Defined Part Class** sheet.

2. Locate the record, edit the **Dry Weight** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Verify your changes, and resolve any discrepancies.

Head	IndustryCommodityCode	CommodityType	GeometryType	SymbolDefinition	SymbolIcon	MaterialGrade	GeometricIndustryStandard	PartDataBasis	PipingPointBasis[1]	Id[1]	PressureRating[1]	EndPreparation[1]	EndStandard[1]	ScheduleThickness[1]	FlowDirection[1]	PipingPointBasis[2]	Id[2]	PressureRating[2]	EndPreparation[2]	EndStandard[2]	ScheduleThickness[2]	FlowDirection[2]	PipingNote1	DryWeight	DryCogX	DryCogY	DryCogZ	Npd[1]	NpdUnitType[1]	Npd[2]	NpdUnitType[2]	FacetoFace
M	VAAAHAAAWAIFABAZZZZUS	GAT	15	SP3DGateValve.CGateValve		60	40	15		150	11	30		3	15	150	11	30		3			65lbm				3 in	3 in	8in
																							110lbm				4 in	4 in	9in
																							188lbm				6 in	6 in	10.5in
																							318lbm				8 in	8 in	11.5in
																							479lbm				10 in	10 in	13in
																							720lbm							

Edit the End Standard in the User Defined Part Class Sheet

The **End Standard** attribute is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct end standard value is **30** for a 150# gate valve with a contractor commodity code "VAAAHAAAWAIFABAZZZZUS".

1. Open the **User Defined Part Class** sheet.

2. Locate the record, edit the **End Standard** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Because editing the **End Standard** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Use **Synchronize Workspace** to update the objects.

7. Verify your changes, and resolve any discrepancies.

Head	IndustryCommodityCode	CommodityType	GeometryType	SymbolDefinition	SymbolIcon	MaterialGrade	GeometricIndustryStandard	PartDataBasis	PipingPointBasis[1]	Id[1]	PressureRating[1]	EndPreparation[1]	EndStandard[1]	ScheduleThickness[1]	FlowDirection[1]	PipingPointBasis[2]	Id[2]	PressureRating[2]	EndPreparation[2]	EndStandard[2]	ScheduleThickness[2]	FlowDirection[2]	PipingNote1	DryWeight	DryCogX	DryCogY	DryCogZ	Npd[1]	NpdUnitType[1]	Npd[2]	NpdUnitType[2]	FacetoFace
M	VAAAHAAAWAIFABAZZZZUS	GAT	15	SP3DGateValve.CGateValve		60	40	15		150	11	30		3	15	150	11	30		3			65lbm				3 in	3 in	8in
																							110lbm				4 in	4 in	9in
																							188lbm				6 in	6 in	10.5in
																							318lbm				8 in	8 in	11.5in
																							479lbm				10 in	10 in	13in
																							720lbm							

Edit the Short Material Description in the Piping Commodity Material Control Data Sheet

The **Short Material Description** in the **Piping Commodity Material Control Data** sheet is not a property used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct short description is "Gate valve, CL150, FFFE, BB, OS&Y, ASTM-A395, brnz trim, Stockham D-623" for 150# gate valve with a contractor commodity code "VAAAHAAAWAIFABAZZZZUS".

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Short Material Description** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Verify your changes, and resolve any discrepancies.

Examples of Pipe Branch Rule Changes

The following examples illustrate workflows to edit all aspects of the pipe branch rule.

Edit the Branch Size in the Pipe Branch Rule Sheet

The **Branch Size** is used to create the unique ID definition. Therefore, you must delete the existing record, and then add a new record with the change. For example, the new requirement dictates a 3 inch size is available in the pipe specification, instead of a 2.5 inch size.

1. Open the **Pipe Branch Rule** sheet.

2. Locate and copy the record.

3. Type **D** at the beginning of the first record.

4. Edit the second record, and then type **A** at the beginning of the record.

5. Bulkload the spreadsheet, and review the log file.

6. Use the **Catalog Checker** to review the impact of your proposed changes.

7. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Use **Synchronize Workspace** to update the objects.

9. Verify your changes, and resolve any discrepancies.

Head	SpecName	HeaderSize		HdrSizeNPDUnitType	BranchSize		BrSizeNPDUnitType	AngleLow	AngleHigh		ShortCode	SecondaryShortCode	TertiaryShortCode
	1C0031	4	in		0.75	in		89.5deg	90.5deg		Sockolet		
	1C0031	4	in		1	in		89.5deg	90.5deg		Sockolet		
D	1C0031	4	in		2.5	in		89.5deg	90.5deg		Weldolet		
A	1C0031	4	in		3	in		89.5deg	90.5deg		Weldolet		
	1C0031	4	in		4	in		89.5deg	90.5deg		Tee		

Edit the Short Code in the Pipe Branch Rule Sheet

Because the **Short Code** is not a property used to create the unique ID definition, type **M** at the beginning of the record, and then apply the changes to the existing record. For example, the new requirement dictates that a reducing tee is placed for 4"x2" lines instead of a weldolet.

1. Open the **Pipe Branch Rule** sheet.

2. Locate the record, edit the **Short Code** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Because editing the S**hort Code** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

5. Use **Synchronize Workspace** to update the objects.

6. Verify your changes, and resolve any discrepancies.

Head	SpecName	HeaderSize		HdrSizeNPDUnitType	BranchSize		BrSizeNPDUnitType	AngleLow	AngleHigh	ShortCode	SecondaryShortCode	TertiaryShortCode
	1C0031	4	in		0.75	in		89.5deg	90.5deg	Sockolet		
	1C0031	4	in		1	in		89.5deg	90.5deg	Sockolet		
M	1C0031	4	in		2	in		89.5deg	90.5deg	Reducing Tee		
	1C0031	4	in		4	in		89.5deg	90.5deg	Tee		

Examples of Valve Operator Changes

The following examples illustrate workflows to edit all aspects of the valve operator data.

Edit the Valve Operator Part Number in the Piping Commodity Material Control Data Sheet

The **Valve Operator Part Number** in the **Piping Commodity Material Control Data** sheet is not a property used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. However, since the valve operator is an output to the symbol definition of the valve, you must mark all affected valve part records as modified by typing **M** at the beginning of each record.

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Valve Operator Part Number** value, and then type **M** at the beginning of the record.

3. In the **Part Classes** sheets, locate the valve parts affected by the changes.

4. At the beginning of each affected valve part record, type **M**.

5. Bulkload the spreadsheet, and review the log file.

6. Use **Catalog Checker** to review the impact of the proposed changes.

7. Because editing the **Valve Operator Part Number** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Use **Synchronize Workspace** to update the objects.

9. Verify your changes, and resolve any discrepancies.

📝 **NOTE** Use the following SQL statement to find all affected valves:

```
Select
x1.oid,
x10.ItemName as PartOcc,
x11.PartNumber,
x15.PrimarySize,
x15.PriSizeNPDUnits,
x15.SecondarySize,
x15.SecSizeNPDUnits,
x14.Name as ClassName,
x4.ValveOperatorCatalogPartNumber as 'Operator PartNumber'
From JPartOcc x1
Join JNamedItem x10 on x10.Oid = x1.oid
Join XmadeFrom x2 on x2.OidOrigin = x1.oid
Join JDPart x11 on x11.Oid = x2.OidDestination
Join JDPipeComponent x15 on x15.Oid = x11.oid
Join XSymbolDefinitionforPartClass x13 on x13.OidDestination = x11.oid
Join JDPartClass x14 on x14.Oid = x13.OidOrigin
Join XPartOccToMaterialControlData x3 on x3.OidOrigin = x1.oid
Join JValveOperatorInfo x4 on x4.Oid = x3.OidDestination
Where x4.ValveOperatorCatalogPartNumber Not like ''
Order by x11.PartNumber, x15.PrimarySize, x15.PriSizeNPDUnits,
x15.SecondarySize, x15.SecSizeNPDUnits
```

Edit the Dimensional Parameter in the User Defined Part Class Sheet

The **Dimensional Parameter** is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. However, since the valve operator is an output to the symbol definition of the valve, you must mark all affected valve part records as modified by typing **M** character at the beginning of each record.

1. Open the **User Defined Part Class** sheet.

2. Locate the record, edit the **Dimensional Parameter** value, and then type **M** at the beginning of the record.

3. In the **Part Classes** sheets, locate the valve parts affected by the changes.

4. At the beginning of each affected valve part record, type **M**.

5. Bulkload the spreadsheet, and review the log file.

6. Use **Catalog Checker** to review the impact of the proposed changes.

7. Because editing the **Dimensional Parameter** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Use **Synchronize Workspace** to update the objects.

9. Verify your changes, and resolve any discrepancies.

Definition	PartClassType	SymbolDefinition	SymbolIcon													
	ValveOperatorClass	SP3DOP3.COP3	SymbolIcons\SP3DOP3.gif												
CommodityPart															
Head	ValveOperatorNumber	SymbolDefinition		MirrorBehaviorOption	DimensionalBasis	ValveOperatorIsRotatable	DryWeight	DryCogX	DryCogY	DryCogZ	ValveSize	ValveSizeUnits	OperatorHeight	OperatorDiameter	
Start															
M	GAT-Bolted-150-3					5					4	in	30in	13.75in	
											5	in	31.75in	13.75in	
											6	in	35.375in	15.5in	

⚠ **CAUTION** Use a SQL statement to find all affected valves. For more information, see *Edit the Valve Operator Part Number in the Piping Commodity Material Control Data Sheet* (on page 283).

Examples of Generic Dimensional Data Changes

The following examples illustrate workflows to edit all aspects of the generic dimensional data.

Edit the Flange Thickness in the Piping Generic Data Bolted Sheet

The **Flange Thickness** in the **Piping Generic Data Bolted** sheet is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct flange thickness for 1.25 inch size, 125# pressure rating, flat-face flanged end is 0.5 inches based on the ASME B16.5 standard.

1. Open the **Piping Generic Data Bolted** sheet.

2. Locate the record, edit the **Flange Thickness** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Because editing the **Flange Thickness** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

5. Use **Synchronize Workspace** to update the objects.

6. Verify your changes, and resolve any discrepancies.

Add a new size for the schedule thickness S-5S in the Plain Piping Generic Data Sheet

You can add new records to the **Plain Piping Generic Data** sheet. For example, the new requirement dictates that the project needs a 0.75 inch plain pipe with schedule S-5S.

1. Open the **Piping Piping Generic Data** sheet.

2. Type **A** at the beginning of the new record, and then define the record as shown:

3. Bulkload the spreadsheet, and review the log file.

4. Verify your changes, and resolve any discrepancies.

Examples of Gasket Data Changes

The following examples illustrate workflows for editing all aspects of the gasket data.

Edit the Gasket Commodity Code in the Gasket Selection Filter Sheet

The contractor **Commodity Code** in the **Gasket Selection Filter** sheet is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the new requirement dictates that the 1C0031 specification needs a new default contractor commodity for the 0.75 inch to 24 inch size range.

1. Open the **Gasket Selection Filter** sheet.

2. Locate the record, edit the **Commodity Code** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Because editing the **Commodity Code** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Use **Synchronize Workspace** to update the objects.

7. Verify your changes, and resolve any discrepancies.

⚠ **CAUTION** Make sure that the corresponding gasket part definition and the material control data for the new contractor commodity code exist in the catalog.

Edit the Nominal Pipe Diameter Range in the Gasket Selection Filter Sheet

The **Nominal Pipe Diameter Range** in the **Gasket Commodity Filter** sheet is used to create the unique ID definition of the record. Therefore, you must remove the existing record from the catalog by typing **D** at the beginning of the record. Then, add a new record with the changes. For example, the new requirement dictates that the 1C0031 specification needs a gasket up to 30 inches in size.

1. Open the **Gasket Commodity Filter** sheet.

2. Locate and copy the record.

3. Type **D** at the beginning of the first record.

4. Edit the second record, and then type **A** at the beginning of the record.

5. Bulkload the spreadsheet, and review the log file.

6. Use the **Catalog Checker** to review the impact of your proposed changes.

7. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Verify your changes, and resolve any discrepancies.

Add an Optional Gasket Commodity Code in the Gasket Selection Filter Sheet

You can add an optional **Gasket Commodity Code** to the **Gasket Selection Filter** sheet. For example, the new requirement dictates that the 1C0031 specification needs an optional gasket for the 2 inch to 24 inch size range.

1. Open the **Gasket Selection Filter** sheet.

2. Create a new record, type **A** at the beginning of the record, and define the record as shown:

3. Bulkload the spreadsheet, and review the log file.

4. Verify your changes, and resolve any discrepancies.

Edit the Gasket Thickness in the Gasket Part Data Sheet

Gasket Thickness is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the new requirement dictates that the gasket thickness value is 0.125 inches for commodity code "GMAHACABXBEPUS".

1. Open the **Gasket Part Data** sheet.

2. Locate the record, edit the **Gasket Thickness** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Because editing the **Gasket Thickness** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Use **Synchronize Workspace** to update the objects.

7. Verify your changes, and resolve any discrepancies.

Edit the Short Description in the Piping Commodity Material Control Data Sheet

The **Short Description** in the **Piping Commodity Material Control Data** sheet is not used to create the unique ID definition of the record. You can therefore mark the existing record by typing **M** at the beginning of the record. For example, the correct short description is "Gasket, CL150, 0.0625" thk comp sheet, org fiber/nitrile binder, ASME-B16.21" for commodity code "GAAHAAAALBFIUS".

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Short Description** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Verify your changes, and resolve any discrepancies.

Edit the Reporting Type in the Piping Commodity Material Control Data Sheet

Occurrences attributes are attributes that display on the **Occurrence** tab of the object's **Properties** dialog box. If the piping designer specifies the **Reporting Type** in the 3D model, the property value in the model is not updated with the corresponding value in the reference data during the synchronization process. Create a filter to select the objects that the software must update, and then use the property page to type or select the correct value.

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Reporting Type** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use the filter to select and update the impacted objects.

5. Verify your changes, and resolve any discrepancies.

Examples of Bolt Data Changes

The following examples illustrate workflows for editing all aspects of the bolt data.

Edit the Bolt Commodity Code in the Bolt Selection Filter Sheet

The contractor **Commodity Code** in the **Bolt Selection Filter** sheet is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the new requirement dictates that the 1C0031 specification needs a new default gasket contractor commodity for the 0.75 inch to 36 inch size range.

1. Open the **Bolt Selection Filter** sheet.

2. Locate the record, edit the **Commodity Code** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Catalog Checker** to review the impact of the proposed changes.

5. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

6. Use **Synchronize Workspace** to update the objects.

7. Verify your changes, and resolve any discrepancies.

Head	SpecName	NominalDiameterFrom	NominalDiameterTo	NpdUnitType	BoltOption	MaximumTemperature	EndPreparation	PressureRating	EndStandard	AlternateEndPreparation	AlternatePressureRating	AlternateEndStandard	ContractorCommodityCode	Priority	BoltExtensionOption	FabricationCategoryOverride	SupplyResponsibilityOverride	Comments	PipingNote1	LubricationRequirements
M	1C0031	0.75	36	in	1		21	150	5				BAZZZZZZAAYBEUZZUS	1	7		10			
	1C0031	0.75	24	in	1		21	150	5	121	150	5	BAZZZZZZAAYBEUZZUS	1	7		10			
	1C0031	0.75	24	in	1		21	150	5	211	150	5	BAZZZZZZAAYBEUZZUS	1	7		10			

Edit the Nominal Pipe Diameter Range in the Bolt Selection Filter Sheet

The **Nominal Pipe Diameter Range** in the **Bolt Commodity Filter** sheet is used to create the unique ID definition of the record. Therefore, you must remove the existing record from the catalog by typing **D** at the beginning of the record. Then, add a new record with the changes. For example, the new requirement dictates that the 1C0031 specification requires the availability of bolts up to 42 inches in size.

1. Open the **Bolt Commodity Filter** sheet.

2. Locate and copy the record.

3. Type **D** at the beginning of the first record.

4. Edit the second record, and then type **A** at the beginning of the record.

5. Bulkload the spreadsheet, and review the log file.

6. Use the **Catalog Checker** to review the impact of your proposed changes.

7. Use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Verify your changes, and resolve any discrepancies.

Add an Optional Bolt Commodity Code in the Bolt Selection Filter Sheet

You can add an optional **Bolt Commodity Code** in the **Bolt Selection Filter** sheet. For example, the new requirement dictates that the 1C0031 specification needs an optional bolt for sizes ranging from 0.75 inches to 36 inches.

1. Open the **Bolt Selection Filter** sheet.

2. Create a new record, type A at the beginning, and define the record as shown:

3. Bulkload the spreadsheet, and review the log file.

4. Verify your changes, and resolve any discrepancies.

Edit the Short Description in the Piping Commodity Material Control Data Sheet

The **Short Description** in the **Piping Commodity Material Control Data** sheet is not used to create the unique ID definition of the record. You can therefore mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct short description for a bolt with contractor commodity code "BAZZZZZZAAYBFVZZUS" is "Studbolts w/hex nuts, ASTM-A193-B8C Cl.1, Electrofilm 2006 coated."

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Short Description** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use **Synchronize Model with Catalog** to mark and update the out-of-date objects.

5. Verify your changes, and resolve any discrepancies.

Edit the Reporting Type in the Piping Commodity Material Control Data Sheet

Occurrence attributes display on the **Properties > Occurrence** tab of the object. If the piping designer specifies the value for the **Reporting Type** in the 3D model, the property value in the model is not updated with the corresponding value in the reference data during the synchronization process. Create a filter to select the objects to update, and then type or select the correct value for the **Reporting Type**.

1. Open the **Piping Commodity Material Control Data** sheet.

2. Locate the record, edit the **Reporting Type** value, and then type **M** at the beginning of the record.

3. Bulkload the spreadsheet, and review the log file.

4. Use the **Filter** to select and update the impacted objects.

5. Verify your changes, and resolve any discrepancies.

Edit the Bolt Extension for Studs and Machine Bolts in the Bolt Extension Sheet

The **Bolt Extension** for studs and machine bolts in the **Bolt Extension** sheet is not used to create the unique ID definition of the record. Therefore, you can mark the existing record as modified by typing **M** at the beginning of the record. For example, the correct **Bolt Extension** for a 6 inch nominal pipe diameter connection is 5 mm. However, since the bolt extension rule is a plant rule, you must update all affected bolted connections. You can do this by typing **M** at the beginning of all affected records in the **Piping Generic Data Bolted** sheet.

1. Open the **Bolt Extension** sheet.

2. Locate the record, edit the **Bolt Extension** value, and then type **M** at the beginning of the record.

3. In the **Piping Generic Data Bolted** sheet, locate the bolt parts affected by the changes.

4. At the beginning of each affected valve part record, type **M**.

5. Bulkload the spreadsheet, and review the log file.

6. Use **Catalog Checker** to review the impact of the proposed changes.

7. Because editing the **Bolt Extension** impacts the modeled objects, use **Synchronize Model with Catalog** to mark the out-of-date objects.

8. Use **Synchronize Workspace** to update the objects.

9. Verify your changes, and resolve any discrepancies.

Examples of .NET Symbol Definition Changes

Symbol definition specifies the inputs and outputs used to create the graphical representation of the object. You can locate the symbol definitions in the model database. This section lists some recommendations for .NET symbol changes so that the persisted symbol definitions and the related data are not corrupted in the model database.

Edit the Inputs of a Symbol Definition

The software currently requires a symbol to declare a set of inputs that creates a set of outputs. To declare an input, you must define the enumerated index, name, description, and the optional property of that input. An example of the declaration of the inputs is shown below:

```
<SymbolVersion("1.0.0.0")> _
Public Class CBallTy1
    Inherits CustomSymbolDefinition


#Region "Definition of Inputs"

    <InputCatalogPart(1)> Public m_oPartDef As InputCatalogPart
    <InputDouble(2, "FacetoFace", "FacetoFace", 0.3, True)> Public m_dFacetoFace As InputDouble
    <InputDouble(3, "Face1toCenter", "Face1toCenter", 0.3, True)> Public m_dFace1toCenter As InputDouble
    <InputDouble(4, "Face2toCenter", "Face2toCenter", 0.3, True)> Public m_dFace2toCenter As InputDouble
    <InputDouble(5, "CylHeight", "CylinderHeight", 0.2)> Public m_dCylHeight As InputDouble

#End Region
```

NOTES

- You cannot modify the index, name, or input type.
- You cannot delete an input.
- You cannot place an optional input in a mandatory input.
- You cannot add a new input in the middle of existing inputs.

Edit the Outputs of a Symbol Definition

The software currently requires a symbol to declare each of the representations the software generates. Declaring a representation includes defining the name, description, aspect ID, and subroutine used to generate the outputs of that representation. For each representation, the

symbol must declare each of the outputs. Declaring an output includes defining the name and description. An example of the declaration of the outputs follows below:

```
#Region "Definition of Aspects and their Outputs"

    'Physical Aspect
    <Aspect("Physical", "Physical Aspects", AspectID.SimplePhysical)> _
    <SymbolOutput("Body0", "Body0")> _
    <SymbolOutput("Body1", "Body1")> _
    <SymbolOutput("PipePort1", "PipePort1")> _
    <SymbolOutput("PipePort2", "PipePort2")> _
    Public m_oPhysicalAspect As AspectDefinition

#End Region
```

NOTES

- You cannot modify the aspect, aspect ID, or the name of an output of a static symbol.

- You cannot delete an aspect ID or the output of a static symbol.

Edit the Code to Generate Outputs of a Symbol Definition

The software requires a symbol to provide subroutines for generating the outputs for each representation. Each output is created, initialized with data, and then added to the output collection. When the code is changed in these subroutines, the name of the output must not

change when it is added to the output collection. An example code to generate the outputs follows below:

```vb
#Region "Construction of outputs of all aspects"
    Protected Overrides Sub ConstructOutputs()
        Dim oPart As Part = Nothing
        Dim oConnection As SP3DConnection = Nothing
        Dim dFacetoFace As Double = 0.0
        Dim dCylHeight As Double = 0.0
        oPart = m_oPartDef.Value
        dCylHeight = m_dCylHeight.Value
        oConnection = OccurrenceConnection

        ' Construction of Physical Aspect

        Dim oGeomHlpr As New SymbolGeometryHelper()
        Dim oXAxis As New Vector(1, 0, 0), oYAxis As New Vector(0, 1, 0), oZAxis As New Vector(0, 0, 1)
        Dim oNegXAxis As New Vector(-1, 0, 0), oNegYAxis As New Vector(0, -1, 0), oNegZAxis As New Vector(0, 0, -1)
        Dim oOrigin As New Position(0, 0, 0)
        oGeomHlpr.ActivePosition = oOrigin
        dFacetoFace = m_dFacetoFace.Value
        m_oPhysicalAspect.Outputs("Body0") = oGeomHlpr.CreateSphere(oConnection, dFacetoFace / 3.0)
        oGeomHlpr.MoveToPoint(New Position(-0.5 * dFacetoFace, 0, 0))
        m_oPhysicalAspect.Outputs("Body1") = oGeomHlpr.CreateCylinder(oConnection, dCylHeight / 4, dFacetoFace / 2.0)

        Dim oPipePortDef1 As PipePortDef, oPipePortDef2 As PipePortDef
        oPipePortDef1 = oPart.PortDefinitions.Item(0)
        oPipePortDef2 = oPart.PortDefinitions.Item(1)

        Dim oPlacementPos As New Position(-0.5 * dFacetoFace _
                        + oPipePortDef1.SeatingOrGrooveOrSocketDepth - oPipePortDef1.FlangeProjectionOrSocketOffset, 0, 0)
        m_oPhysicalAspect.Outputs("PipePort1") = _
        New PipeNozzle(oPart, oConnection, False, 1, oPlacementPos, oNegXAxis, 0.0, False)
        oPlacementPos.Set(0.5 * dFacetoFace _
                        - oPipePortDef2.SeatingOrGrooveOrSocketDepth + oPipePortDef2.FlangeProjectionOrSocketOffset, 0, 0)
        m_oPhysicalAspect.Outputs("PipePort2") = _
                        New PipeNozzle(oPart, oConnection, False, 2, oPlacementPos, oXAxis, 0.0, False)
    End Sub

#End Region
```

🗐 NOTES

- If an output is declared, but no actual output with a matching name is created, the symbol fails to update.

- If multiple output objects with the same name are found, the symbol fails to update.

Unique ID Definition

For all objects and their corresponding unique properties, see *Uniqueness of Objects* in the *Smart 3D Reference Data Guide*.

APPENDIX B

Appendix: Piping

This appendix contains information about everything you see under the main Piping node in the tree view. You may have to bulkload some optional workbooks to see all the information described in this appendix.

The information is organized in the same order as it appears in the tree view.
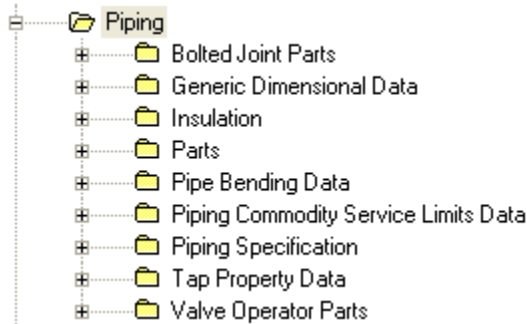
Delivered Pipe Specifications

The piping reference data is defined in multiple Microsoft Excel workbooks. The software delivers these workbooks to the *[Product Folder]*\CatalogData\Bulkload\Datafiles and the *[Product Folder]*\CatalogData\Bulkload\SampleDataFiles folders. This appendix lists all of the piping specifications defined in these workbooks.

A majority of the all specifications are delivered in **Piping Specification.xls** and the corresponding parts are delivered in **Piping Catalog.xls**.

Because bulkloading all of these specifications would create a very large catalog, a subset of ten specifications are used to create the CatalogDB.dat file that is delivered with the software. This subset of ten specifications is delivered in the **Ten_Specs_SpecificationData.xls** and **Ten_Specs_CatalogData.xls** workbooks and is marked in the table with an asterisk (*).

The **Piping.xls** workbook contains four example pipe specifications (N0, N1, 1C0100, and 1C0101) that Intergraph uses for testing purposes. These four example pipe specifications are also available in the delivered CatalogDB.dat file.

Specification	Materials Description	Fluid Service	Workbook
1C0019	CL150 FFFE, CS Cement Lined	Underground fire water	Piping Specification.xls
1C0031 *	CL150 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
1C0031_ReinforcedBranching	CL150 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process	Sample Data For Reinforced Branches using Implied Pipe Stock.xls

Specification	Materials Description	Fluid Service	Workbook
1C0035	CL150 RFFE, CS, Trim 8, CA 0.063, Process, other	Nitrogen gas	Piping Specification.xls
1C0043	CL150 RFFE, CS, Trim 8, (ANSI-B31.1)	Low pressure CL150 steam	Piping Specification.xls
1C0045	CL150 RFFE, CS, Trim 8, CA 0.063, Steam B31.3	Low pressure CL150 steam	Piping Specification.xls
1C0048	CL150 RFFE, CS, Trim 8, CA 0.063, Category D	Plant air	Piping Specification.xls
1C0049	CL150 RFFE, CS, Trim 8, CA 0.125, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
1C0065	CL150 RFFE, CS, Trim 8, CA 0.188, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
1C0073	CL150 RFFE, CS, Trim 8, CA 0.25, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
1C0100	CL150 RFFE, CS, PTFE Lined, Std Trim, Flanged Pipe and Fittings	ASME Class 150 Process	Piping.xls
1C0101	CL150 RFFE, CS, PTFE Lined, Std Trim, Flanged Pipe and Fittings	ASME Class 150 Process	Piping.xls
1C0105	CL150 RFFE, CS, Trim 9	0-50% caustic solution	Piping Specification.xls
1C0153	CL150 RFFE, CS, Trim 13	93-97% sulfuric acid	Piping Specification.xls
1C0171	CL150 RFFE, CS, 316 Trim	General catalyst	Piping Specification.xls
1C0176	CL150 RFSF, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process with H2	Piping Specification.xls
1C0182	CL150 RFSF, CS, Trim 8, CA 0.063, Process, other	Process with benzene	Piping Specification.xls
1C0185	CL150 RFSF, CS, Trim 8, CA 0125, Process, hot (-20 to 800 degF)	Process with H2	Piping Specification.xls
1C0458	CL150 BE, CS	Catalyst lift lines	Piping Specification.xls
1C0460	CL150 FFFE, Galv CS, Bronze Trim	Potable water	Piping Specification.xls
1C0548	CL150 RFFE, Killed CS, Trim 12, CA 0.125, Caustic/Amine	Process with rich/lean amine	Piping Specification.xls
1C0564	CL150 RFFE, Killed CS, Trim 12, CA 0.25, Caustic/Amine	Process with rich/lean amine	Piping Specification.xls
1C0600	CL150 RFFE, Killed CS, NACE, Trim 12, CA 0.063	Process with aqueous H2S	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
1C0609	CL150 RFFE, Killed CS, NACE, Trim 12, CA 0.125	Process with aqueous H2S	Piping Specification.xls
1C0618	CL150 RFFE, Killed CS, NACE, Trim 12, CA 0.25	Process with aqueous H2S	Piping Specification.xls
1C0841	CL150 RFFE, Low Temp CS, Trim 2	Low temperature process	Piping Specification.xls
1C0841X	CL150 RFFE, Low Temp CS, Trim 2	Low temperature process	Additional data for ASME B16.47 Flanges Specification.xls
1C0841Y	CL150 RFFE, Low Temp CS, Trim 2	Low temperature process	Additional data for ASME B16.47 Flanges Specification.xls
1FE0A01	150 PSI, Glass Fiber Reinforced Epoxy (RTR), Adhesive, Process and Utilities	Process & Utilities (Aboveground & Underground)	Sample Data For End Preparation Compatibility Exceptions Rule.xls
1K7001	CL150, Copper , Flared Pipe and Fittings	Piping Spec 1K7001 Service	Flared Piping Specification.xls
1L1671	CL150 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.063	Process with H2	Piping Specification.xls
1L1677	CL150 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.125	Process with H2	Piping Specification.xls
1L3013	CL150 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.063	Process	Piping Specification.xls
1L3027	CL150 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.125	Process	Piping Specification.xls
1L3040	CL150 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.188	Process	Piping Specification.xls
1L3048	CL150 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.25	Process	Piping Specification.xls
1L3725	CL150 RFFE, 9Cr-1Mo, Trim 8, CA 0.125	Process	Piping Specification.xls
1L3746	CL150 RFFE, 9Cr-1Mo, Trim 8, CA 0.25	Process	Piping Specification.xls
1N7540	CL150 RFFE, Inconel 600, Inconel Trim	Chlorination gas	Piping Specification.xls
1S3977 *	CL150 RFFE, 304/CS Valves, Trim 8	Lube and seal oil	Piping Specification.xls
1S3984 *	CL150 RFFE, 304/316 Valves, Trim 12	Process	Piping Specification.xls
1S3988	CL150 RFFE, 304, Trim 2, Process, colder (-20 to -150 degF)	Low temperature process	Piping Specification.xls
1S3991	CL150 RFFE, 304, Trim 2, Process, coldest (-20 to -425 degF)	Low temperature process	Piping Specification.xls
1S4104	CL150 RFFE, 304, 316 Trim	Catalyst addition	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
1S4488	CL150 RFFE, 304/316 Valves, Trim 2	Demineralized water	Piping Specification.xls
1S5135	CL150 RFFE, 316, Trim 12, CA 0.063, Process, cold (-20 to -50 degF)	Process Special	Piping Specification.xls
1S5187	CL150 RFFE, 316, Trim 12, CA 0.03, Process, coldest (- 20 to -425 degF)	Process	Piping Specification.xls
1S5197	CL150 RFFE, 316, Trim 12, CA 0.03, Process, other	Process Special	Piping Specification.xls
1S5500	316L Stainless Steel Tubing, ETBW and Clamped	BioPharm ASME BPE Process	Bio Pharm Specification.xls
1S6470	316 Stainless Steel, VGRE	Process	1S6470 Specification.xls
2C0032 *	CL300 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
2C0050	CL300 RFFE, CS, Trim 8, CA 0.125, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
2C0066	CL300 RFFE, CS, Trim 8, CA 0.188, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
2C0074	CL300 RFFE, CS, Trim 8, CA 0.25, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
2C0106	CL300 RFFE, CS, Trim 9	0-50% caustic solution	Piping Specification.xls
2C0177	CL300 RFSF, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process with H2	Piping Specification.xls
2C0183	CL300 RFSF, CS, Trim 8, CA 0.063, Process, other	Process with benzene	Piping Specification.xls
2C0186	CL300 RFSF, CS, Trim 8, CA 0.125, Process, hot (-20 to 800 degF)	Process with H2	Piping Specification.xls
2C0320	CL300 RFFE-SF, CS, 316 Trim	Catalyst with hydrogen	Piping Specification.xls
2C0394	CL300 BE/RFFE, CS, Trim 8, (ANSI-B31.1)	Low pressure CL150 steam	Piping Specification.xls
2C0400	CL300 BE/RFFE, CS, Trim 8, (ANSI-B31.3)	Low pressure CL150 steam	Piping Specification.xls
2C0459	CL300 BE, CS	Catalyst lift lines	Piping Specification.xls
2C0549	CL300 RFFE, Killed CS, Trim 12, CA 0.125, Caustic/Amine	Process with rich/lean amine	Piping Specification.xls
2C0557	CL300 RFFE, Killed CS, Trim 12, CA 0.188, Caustic/Amine	Process with rich/lean amine	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
2C0577	CL300 RFFE, Killed CS, NACE, Trim 9, CA 0.125	Process with aqueous H2S	Piping Specification.xls
2C0593	CL300 RFFE, Killed CS, NACE, Trim 9, CA 0.25	Process with aqueous H2S	Piping Specification.xls
2C0601	CL300 RFFE, Killed CS, NACE, Trim 12, CA 0.063	Process with aqueous H2S	Piping Specification.xls
2C0610	CL300 RFFE, Killed CS, NACE, Trim 12, CA 0.125	Process with aqueous H2S	Piping Specification.xls
2C0619	CL300 RFFE, Killed CS, NACE, Trim 12, CA 0.25	Process with aqueous H2S	Piping Specification.xls
2C0722	CL300 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.125	Process with H2 & H2S	Piping Specification.xls
2C0730	CL300 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.25	Process with H2 & H2S	Piping Specification.xls
2C0842	CL300 RFFE, Low Temp CS, Trim 2	Low temperature process	Piping Specification.xls
2L1669	CL300 RFFE, 1.25Cr-0.5Mo, 316 Trim, Std RF, other	Catalyst withdrawal lines	Piping Specification.xls
2L1670 *	CL300 RFFE, 1.25Cr-0.5Mo, 316 Trim, MJ, other	Catalyst lift lines	Piping Specification.xls
2L1672	CL300 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.063	Process with H2	Piping Specification.xls
2L1678	CL300 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.125	Process with H2	Piping Specification.xls
2L3014	CL300 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.063	Process	Piping Specification.xls
2L3028	CL300 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.125	Process	Piping Specification.xls
2L3041	CL300 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.188	Process	Piping Specification.xls
2L3049	CL300 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.25	Process	Piping Specification.xls
2L3203	CL300 RFFE-SF, 5Cr-0.5Mo, NACE, Trim 8	Process with H2 & H2S	Piping Specification.xls
2L3726	CL300 RFFE, 9Cr-1Mo, Trim 8	Process	Piping Specification.xls
2L3747	CL300 RFFE, 9Cr-1Mo, Trim 8	Process	Piping Specification.xls
2S3978	CL300 RFFE, 304/CS Valves, Trim 8	Lube and seal oil	Piping Specification.xls
2S3985 *	CL300 RFFE, 304/316 Valves, Trim 12	Process	Piping Specification.xls
2S3989	CL300 RFFE, 304, Trim 2	Low temperature process	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
2S4396	CL300 RFFE, 304L/316 Valves, Trim 12	Process with severe amine	Piping Specification.xls
2S5188	CL300 RFFE, 316, Trim 12	Process	Piping Specification.xls
2S6246	CL300 RFFE-SF, 321/347 Valves, 347HF Trim, CA 0.03, Process, hotter (-20 to 1000+/- degF)	Process with H2 & H2S	Piping Specification.xls
2S6258	CL300 RFFE-SF, 321/347 Valves, 347HF Trim, CA 0.063, Process, hotter (-20 to 1000+/- degF)	Process with H2 & H2S	Piping Specification.xls
4C0033 *	CL600 RFFE, CS, Trim 8, CA 0.063, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
4C0051	CL600 RFFE, CS, Trim 8, CA 0.125, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
4C0075	CL600 RFFE, CS, Trim 8, CA 0.25, Process, hot (-20 to 800 degF)	Process	Piping Specification.xls
4C0389	CL600 BE/RFFE, CS, Trim 8, (ASME-I)	Low pressure CL150 steam	Piping Specification.xls
4C0395	CL600 BE/RFFE, CS, Trim 8, (ANSI-B31.1)	Low pressure CL150 steam	Piping Specification.xls
4C0401	CL600 BE/RFFE, CS, Trim 8, (ANSI-B31.3)	Low pressure CL150 steam	Piping Specification.xls
4C0602	CL600 RFFE, Killed CS, NACE, Trim 12, CA 0.063	Process with aqueous H2S	Piping Specification.xls
4C0611	CL600 RFFE, Killed CS, NACE, Trim 12, CA 0.125	Process with aqueous H2S	Piping Specification.xls
4C0620	CL600 RFFE, Killed CS, NACE, Trim 12, CA 0.25	Process with aqueous H2S	Piping Specification.xls
4C0630	CL600 RFFE-SF, Killed CS, Trim 8	Process with H2	Piping Specification.xls
4C0723	CL600 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.125	Process with H2 & H2S	Piping Specification.xls
4C0731	CL600 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.25	Process with H2 & H2S	Piping Specification.xls
4C0844	Carbon Steels	Process	4C0844 Specification.xls
4L1673	CL600 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.063	Process with H2	Piping Specification.xls
4L1679	CL600 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.125	Process with H2	Piping Specification.xls
4L1691	CL600 RFFE-SF, 1.25Cr-0.5Mo, Trim 8, CA 0.25	Process with H2	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
4L3029	CL600 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.125	Process	Piping Specification.xls
4L3042	CL600 RFFE, 5Cr-0.5Mo, Trim 8, CA 0.188	Process	Piping Specification.xls
4L3204	CL600 RFFE-SF, 5Cr-0.5Mo, NACE, Trim 8	Process with H2 & H2S	Piping Specification.xls
4L3748	CL600 RFFE, 9Cr-1Mo, Trim 8	Process	Piping Specification.xls
4S3979	CL600 RFFE, 304/CS Valves, Trim 8	Lube and seal oil	Piping Specification.xls
4S5189	CL600 RFFE, 316, Trim 12	Process	Piping Specification.xls
4S6247	CL600 RFFE-SF, 321/347 Valves, 347HF Trim	Process with H2 & H2S	Piping Specification.xls
5C0076	CL900 RFFE, CS, Trim 8	Process	Piping Specification.xls
5C0390 *	CL900 BE/RFFE, CS, Trim 5, (ASME-I)	Low pressure CL150 steam	Piping Specification.xls
5C0396	CL900 BE/RFFE, CS, Trim 5, (ANSI-B31.1)	Low pressure CL150 steam	Piping Specification.xls
5C0402	CL900 BE/RFFE, CS, Trim 5, (ANSI-B31.3)	Low pressure CL150 steam	Piping Specification.xls
5C0551	CL900 RFFE, Killed CS, Trim 12	Process with rich/lean amine	Piping Specification.xls
5C0724	CL900 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.125	Process with H2 & H2S	Piping Specification.xls
5C0732	CL900 RFFE-SF, Killed CS, NACE, Trim 12, CA 0.25	Process with H2 & H2S	Piping Specification.xls
5L1868	CL900 BE/RFFE, 1.25Cr-0.5Mo, Trim 5, (ASME-I)	High pressure CL900 steam	Piping Specification.xls
5L1874	CL900 BE/RFFE, 1.25Cr-0.5Mo, Trim 5, (ANSI-B31.1)	High pressure CL900 steam	Piping Specification.xls
5L3193	CL900 RFFE-SF, 5Cr-0.5Mo, Trim 8	Process with H2	Piping Specification.xls
5L3749	CL900 RFFE, 9Cr-1Mo, Trim 8	Process	Piping Specification.xls
5S3980	CL900 RFFE, 304/CS Valves, Trim 8	Lube and seal oil	Piping Specification.xls
5S6449	CL900 BE/RFFE-SF, 321/347 Valves, 347HF Trim	Process with H2 & H2S	Piping Specification.xls
6C0391 *	CL1500 BE/RJFE, CS, Trim 5, (ASME-I)	Low pressure CL150 steam	Piping Specification.xls
6C0397	CL1500 BE/RJFE, CS, Trim 5, (ANSI-B31.1)	Low pressure CL150 steam	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
6C0403	CL1500 BE/RJFE, CS, Trim 5, (ANSI-B31.3)	Low pressure CL150 steam	Piping Specification.xls
6C0407	CL1500 BE/RJFE, CS, Trim 8	Process	Piping Specification.xls
6C0785	CL1500 BE/RJFE, Killed CS, Trim 8, std trim	Process with H2	Piping Specification.xls
6C0794	CL1500 BE/RJFE, Killed CS, Trim 8, SS trim	Process with H2	Piping Specification.xls
6C0800	CL1500 BE/RJFE, Killed CS, NACE, Trim 12	Process with aqueous H2S	Piping Specification.xls
6C0803	CL1500 BE/RJFE, Killed CS, Trim 12	Process with rich/lean amine	Piping Specification.xls
6L1864	CL1500 BE/RJFE, 1.25Cr-0.5Mo, Trim 8, CA 0.063	Process with H2	Piping Specification.xls
6L1869	CL1500 BE/RJFE, 1.25Cr-0.5Mo, Trim 5, (ASME-I)	Extra pressure CL1500 steam	Piping Specification.xls
6L1875	CL1500 BE/RJFE, 1.25Cr-0.5Mo, Trim 5, (ANSI-B31.1)	Extra pressure CL1500 steam	Piping Specification.xls
6L1882	CL1500 BE/RJFE, 1.25Cr-0.5Mo, Trim 5, (ANSI-B31.3)	Extra pressure CL1500 steam	Piping Specification.xls
6L1885	CL1500 BE/RJFE, 1.25Cr-0.5Mo, Trim 8, CA 0.125	Process with H2	Piping Specification.xls
6L3390	CL1500 BE/RJFE, 5Cr-0.5Mo, Trim 8	Process with H2 & H2S	Piping Specification.xls
6S4218	CL1500 RJFE, 304/CS Valves, Trim 8	Lube and seal oil	Piping Specification.xls
6S6450	CL1500 BE/RJFE, 321/347 Valves, 347HF Trim, CA 0.03	Process with H2 & H2S	Piping Specification.xls
6S6457	CL1500 BE/RJFE, 321/347 Valves, 347HF Trim, CA 0.063	Process with H2 & H2S	Piping Specification.xls
8F0002	Gravity Head, Gray Cast Iron	Storm sewer	Piping Specification.xls
8F0003	Gravity Head, Ductile Iron Cement Lined	Storm sewer	Piping Specification.xls
8X7687	Gravity Head, Vitrified Clay	Storm sewer	Piping Specification.xls
8X7689	Gravity Head, Reinforced Concrete	Storm sewer	Piping Specification.xls
9F0006	AWWA 150# MJ, Ductile Iron Cement Lined	Raw water	Piping Specification.xls
9L3760	Undefined	Process	9L3760 Specification.xls
9X7733	SCH-80, SE, PVC	Chlorine in water	Piping Specification.xls

Specification	Materials Description	Fluid Service	Workbook
A4	Carbon Steel, A-53B	Victaulic	Victaulic Spec A4.xls
A11	Carbon Steel, A-53B	Victaulic	Victaulic Spec A11.xls
AC0014 *	CL125 FFFE, CS, Bronze Trim	Cooling water	Piping Specification.xls
AC0015	CL125 FFFE, CS, Bronze Trim	Cooling water	Sample Data For End Preparation Compatibility Exceptions Rule.xls
AC0016	CL125 FFFE, Bronze Trim	Aboveground fire water	Piping Specification.xls
FC0405	CL800 BE/RFFE, CS, Trim 5, (ANSI-B31.3)	Low pressure CL150 steam	Piping Specification.xls
Jacketed Piping		Process	Sample Data for Jacketed Piping Symbols.xls
N0	CL150, Carbon Steel, RFFE, Trim 8, < 50mm SWE, >= 50mm BE	Piping Spec N0 Service	Piping.xls
N1	CL300, Carbon Steel, RFFE, Trim 8, < 50mm SWE, >= 50mm BE	Piping Spec N1 Service	Piping.xls
Tube192519	Class 600, Alloy 400, Tubing Compression, 0.000" C.A. Process Tubing (PTFE Packing/Gaskets)	Process	Sample Data for NPDCompatibilityExepRule.xls
Vacuum Piping		Piping Spec Vacuum Service	Sample Data for Vacuum Piping.xls

Bolted Joint Parts

Topics

Bolt Part Data Sheet

The **Bolts** node defines the bolts that you want in your parts catalog.

▤ NOTES

- The use of the Smart 3D reference data identification number as the catalog part number for a bolt is currently not supported.

- If the part number column exists on the part class sheet, a unique, non-blank value must exist or the part is not created.

Industry Commodity Code (Required)

Specify the industry commodity code for the part.

★ IMPORTANT All industry commodity codes must be unique across the entire catalog.

Bolt Type (Required)

Specify the bolt type shown as a Codelist value (stud, machine, cap screw, and so forth). The software determines the quantity of nuts and washers on the basis of the bolt type. For machine bolts, a nut and a washer are required for each bolt. One supplementary nut and washer may optionally be required for a machine bolt.

For studs, a nut and a washer are required for each end of the stud. In other words, a stud requires two nuts and two washers. One supplementary nut and washer may optionally be required for each end of a stud.

For cap screws, only a washer is required for each screw. A supplementary washer may optionally be required.

Geometry Industry Standard (Optional)

Select the source used in the preparation of the catalog data applicable to the piping specialty item.

Materials Grade Practice (Required)

Select the material grade practice.

Materials Category (Required)

Select **Bolting materials**.

Material Grade (Required)

Specify the material grade for the part.

Coating Requirement (Optional)

Select the coating requirement.

Coating Type (Optional)

Specify the coating type for the bolt.

Bolt Length Calculations

Per ASME 16.5 (2003) Annex F, the software calculates bolt lengths for stud bolts and machine bolts as:

```
Stud Bolt Length = 2 × (F + W + FT + RF + E + N) + G + R + nt
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```
Machine Bolt Length = 2 × (F + FT + RF) + W + E + N + G + R + p + nt
```

where:

F = Flange thickness specified in the *Bolted End Data* (on page 315) rule
FT = Tolerance for flange thickness specified in the *Bolted End Data* (on page 315) rule
W = Washer thickness specified in the *Washer Part Data Sheet* (on page 314) rule
G = Gasket thickness specified in the *Gasket Part Data Sheet* (on page 309) rule
RF = Raised face projection specified in the *Bolted End Data* (on page 315) rule
E = Bolt extension specified in the *Bolt Extension* (on page 458) rule
R = Total height of facings or depth of ring joint groove for both faces (flange face projection or groove depth)
N = Heavy nut height (equals nominal bolt diameter) or nut height specified in *Nut Part Data Sheet* (on page 313)
nt = Negative tolerance on the bolt length from *Cap Screw Length Calculation Tolerance* (on page 396), *Machine Bolt Length Calculation Tolerance* (on page 403), *Stud Bolt Length Calculation Tolerance* (on page 421), or *Tap End Stud Bolt Calculation Tolerance Rule* (on page 422).
p = Allowance for the height of the point of the machine bolt (= 1.5 × thread pitch)
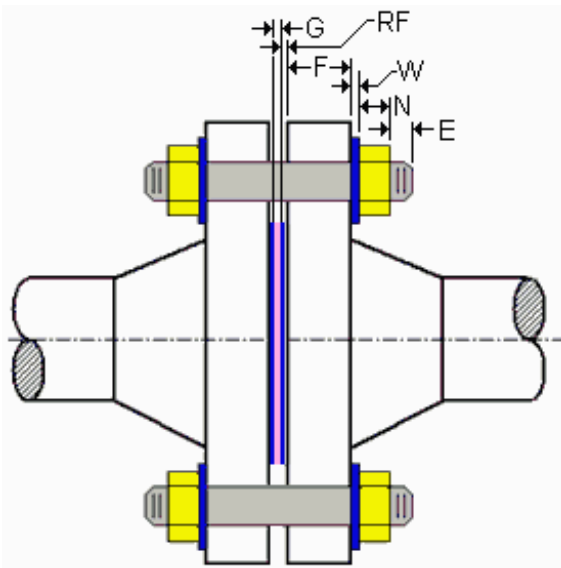
See Also
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)

Gasket Part Data Sheet

The **Gaskets** node defines the gaskets that you want in your parts catalog.

📝 **NOTES**

- The use of the Smart 3D Reference Data identification number as the catalog part number for a gasket is currently not supported.

- If the part number column exists on the part class sheet, a unique, non-blank value must exist or the part is not created.

Flange Facing (Optional)

Select the flange facing for which the gasket is intended to be used. Specify this if you plan to use the flange facing to format the gasket commodity code or if the flange facing is required for reporting purposes.

Flange Insulation Kit Type (Optional)

Select the type of flange insulation kit. This property is only required when the gasket represents a flange insulation kit as indicated by **Gasket Category** being set to "Insulation sets".

Flange Pressure (Optional)

Enter the minimum compressive stress (Y) in pounds per square inch (or bar) on the contact area of the gasket that is required to provide a seal at an internal pressure of 2 psig (0.14 bar). The Flange Pressure is also referred to as the Minimum Design Seating Stress or the Minimum Compressive Stress.

This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec. This value is only to be used for flange designs, as specified in the ASME Boiler and Pressure Vessel Code Division 1, Section VIII, Appendix 2. This value is not intended to be used as the gasket seating stress value in actual service.

Gasket Category (Required)

Select the gasket category. You must specify the gasket category before you can specify the gasket type. If set to "Insulation sets", be sure to set the **Flange Insulation Kit Type**, **Insulating Washer Thickness**, and **Metallic Electro-Plated Washer Thickness** properties.

Gasket Industry Practice (Optional)

Select the industry practice on which the gasket data is based.

Gasket Industry Standard (Optional)

Specify the gasket industry standard.

Gasket Inside Diameter (Optional)

Specify the inside diameter of the gasket. Be sure to include the unit value, for example, **203mm**. If you do not specify a value here, the software automatically determines the inside diameter using the bolted end data.

Gasket Inside Diameter Basis (Optional)

Specify how the software is to compute the inside diameter of the gasket. This value is required only if you need to report the inside gasket diameter and the diameter is computed on the basis of a standard.

Gasket Outside Diameter (Optional)

Specify the outside diameter of the gasket. Be sure to include the unit value, for example, **279mm**.

Gasket Outside Diameter Basis (Optional)

Specify how the software is to compute the outside diameter of the gasket. This value is required only if you need to report the outside gasket diameter and the diameter is computed on the basis of a standard.

Gasket Type (Required)

Specify the gasket type (flat, corrugated, ring, and so forth).

Industry Commodity Code (Required)

Specify the industry commodity code for the gasket part. All industry commodity codes must be unique across the entire catalog.

Installation Man Hours (Optional)

Enter the man hours required to install the gasket.

Insulating Washer Thickness (Optional)

Enter the thickness of the insulating washer in the flange insulation kit. This value is used in determining any additional bolt length required due to the insulating washers. This value is only required when the gasket represents a flange insulation kit as indicated by **Gasket Category** being set to "Insulation sets".

Intersection of Unload Curve with Vertical Axis (Optional)

Enter the intersection of the unload curve with vertical axis as specified by the Pressure Vessel Research Council. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Maintenance Factor (Optional)

Enter a decimal value that represents a factor (M) that provides the additional preload required in the flange fasteners to maintain the compressive load on a gasket after internal pressure is applied to a bolted joint.

This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec. Furthermore, this data is only to be used for flange designs, as specified in the ASME Boiler and Pressure Vessel Code Division 1, Section VIII, Appendix 2. This value is not intended to be used as the gasket seating stress value in actual service.

Maintenance Man Hours (Optional)

Enter the man hours required to maintain the gasket.

Manufacturer (Optional)

Select the gasket manufacturer. You must define the **Manufacturer Industry Practice** before you can select this value.

Manufacturer Industry Practice (Optional)

Select the industry practice for the gasket manufacturer.

Material Category (Required)

Select the material category.

Material Grade (Required)

Specify the material grade for the gasket.

Material Grade Practice (Required)

Select the material grade practice.

Maximum Pressure (Optional)

Enter the maximum pressure for which the gasket is suited. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Maximum Temperature (Optional)

Enter the maximum temperature for which the gasket is suited. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Maximum Tightness Parameter (Optional)

Enter the maximum tightness for which the gasket is suited. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Metallic Electro-Plated Washer Thickness (Optional)

Enter the thickness of the metallic electro-plated washer in the flange insulation kit. This value is used in determining any additional bolt length required due to the electro-plated washers. This value is only required when the gasket represents a flange insulation kit as indicated by **Gasket Category** being set to "Insulation sets".

Nominal Diameter From (Optional)

Define the lower bound of the largest nominal piping diameter for which this gasket applies. This value is only required for those gaskets where the part data (such as the thickness) varies with size but the commodity code for the gasket does not reflect the size.

Nominal Diameter To (Optional)

Define the upper bound of the largest nominal piping diameter for which this gasket applies. This value is only required for those gaskets where the part data (such as the thickness) varies with size but the commodity code for the gasket does not reflect the size.

Nominal Diameter (Optional)

Type the nominal piping diameter for the gasket.

NPD Unit Type (Optional)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters. These units must match the units used in the gasket selection filter (mm or in).

Procurement CIMIS Commodity Code (Optional)

Enter the CIMIS commodity code.

Procurement Client Commodity Code (Optional)

Enter the client commodity code.

Procurement Manufacturer Part No (Optional)

Enter the manufacturer part number.

Procurement Thickness (Required)

Specify the thickness of the gasket for procurement purposes. Be sure to include the unit value, for example, **4mm** or **0.125in**.

Procurement Vendor Part No (Optional)

Enter the vendor part number.

Requisition Number (Optional)

Enter the requisition number.

Ring Number (Conditionally Required)

Type the ring number code for the ring joint gasket. This property is optional and is required only for the situation where the gasket's commodity code does not address the ring number. This property is not required for any other type of gasket.

Ring Number Practice (Conditionally Required)

Select the ring number practice.

Stress at which Seal is Initiated (Optional)

Enter the stress at which the seal of the gasket is initiated, as specified by the Pressure Vessel Research Council. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Style Number (Optional)

Select the manufacturer's gasket style number. Specify this if you plan to use the style to format the gasket commodity code or if the style is required for reporting purposes. You must define the **Manufacturer Industry Practice** and the **Manufacturer** before you can select this value.

Thickness For 3D Model (Required)

Specify the thickness of the gasket as it is to be represented in the model. You can enter zero. Be sure to include the unit value, for example, **4mm** or **0.125in**.

Tightness Curve Slope (Optional)

Enter the decimal value that represents the slope of the log/log tightness curve as specified by the Pressure Vessel Research Council. This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Tightness Parameter Maximum (Optional)

Enter the maximum tightness parameter (Tp). This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Tightness Parameter Minimum (Optional)

Enter the minimum tightness parameter (Tp). This value is only intended to be used for informational purposes in the selection of a gasket to be used by a piping spec.

Unit Cost (Optional)

Enter the price of the gasket.

See Also

Nut Part Data Sheet

The **Nuts** node defines the nuts that you want in your parts catalog.

📝 NOTES

- The use of the Smart 3D reference data identification number as the catalog part number for a nut symbol is currently not supported.

- If the part number column exists on the part class sheet, a unique, non-blank value must exist or the part is not created.

Coating Requirement (Optional)

Select the coating requirement for the nut.

Coating Type (Optional)

Select the coating type for the nut.

Geometric Industry Practice (Optional)

Select the source used in the preparation of the nut catalog data.

Geometric Industry Standard (Optional)

Select the source used in the preparation of the nut catalog data.

Industry Commodity Code (Required)

Type a commodity code for the nut. The software uses this commodity code to find the nut in the parts catalog. This code must be unique across the catalog.

Material Category (Required)

Select the material category.

Material Grade Practice (Required)

Select the material grade practice.

Material Grade (Required)

Specify the material for the nut.

Nut Height (Required)

Enter the nut height. This height is used for the bolt length calculation for both studs and machine bolts from the bolted end generic data. Include the unit of measure, for example **mm** or **in**, when defining this value.

Nut Type (Required)

Specify the nut type (hex, square, and so forth).

See Also

Washer Part Data Sheet

The **Washers** node defines the washers that you want in your parts catalog.

🗐 NOTES

- The use of the Smart 3D reference data identification number as the catalog part number for a washer is currently not supported.
- If the part number column exists on the part class sheet, a unique, non-blank value must exist or the part is not created.

Coating Requirement (Optional)

Select the coating requirement for the washer.

Coating Type (Optional)

Select the coating type for the washer.

Geometric Industry Practice (Optional)

Select the source used in the preparation of the washer catalog data.

Geometric Industry Standard (Optional)

Select the source used in the preparation of the washer catalog data.

Industry Commodity Code (Required)

Specify the industry commodity code for the part. All industry commodity codes must be unique across the entire catalog.

Material Category (Required)

Select the material category.

Materials Grade (Required)

Enter the material grade code for the part.

Material Grade Practice (Required)

Select the material grade practice.

Washer Thickness (Required)

Enter the washer thickness. This thickness is used for the bolt length calculations. Include the unit of measure, for example mm or in, when defining this value.

Washer Type (Required)

Enter the code that represents the washer type (flat, split, conical, and so forth).

See Also

Generic Dimensional Data

Topics

Bolted End Data

The **Bolted End Data** node defines generic bolted end data.

Body Outside Diameter (Conditionally Required)

Enter the fitting body outside diameter at the bolted end. You can specify the body outside diameter in the piping commodity part data (or piping specialty part data or instrument part data) for certain fittings rather than specifying the value here. If you do not enter a value here or in the piping commodity part data (or piping specialty part data or instrument part data), the outside diameter must be available in the plain piping generic data for the same value of the end standard property. Include the units of measure, such as **mm** or **in**, when specifying this value.

Bolt Circle Diameter (Required)

Enter the circle diameter of bolt holes on the face of flange. The bolt circle diameter is a theoretical circle inscribed by the center point of a series of bolt holes, drilled equally spaced, near the mid-circumference of a flange. Include the units of measure, such as **mm** or **in**, when specifying this value.

Bolt Diameter - (Required)

Enter the bolt diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.

Bolt Pattern Length (Conditionally Required)

Enter the length of the drilling template pattern. This is shown as dimension A in the pictures.

Bolt Pattern Offset (Conditionally Required)

Enter the offset for the drilling template pattern. This is shown as dimension B in the pictures.

Bolt Pattern Width (Conditionally Required)

Enter the width of the drilling template pattern. This is shown as dimension C in the pictures.
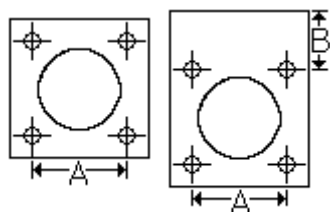
| Square | Square with Offset | Triangle | Oval |

| Rectangle | Rectangle with Offset | Split Flange Face |
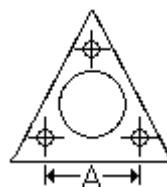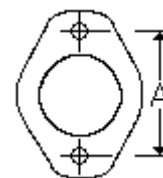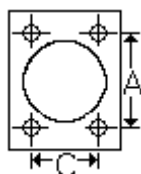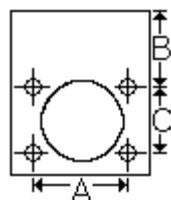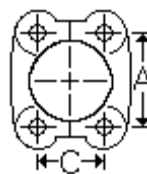
Counter Bore Depth (Conditionally Required)

Enter the counter bore depth for hexagon socket head cap screws specified by JIS B 1176 and used for square flanges per JIS B 2291. A value must be specified here when the value of the **Bolt Type** property is set to "Cap screw, socket head, counter bore."

End Practice (Required)

Select the end practice for the bolted end.

End Preparation (Required)

Select the end preparation for the bolted end.

End Standard (Required)

Select the end standard for the bolted end.

Drilling Template Pattern (Conditionally Required)

Select the arrangement of bolt holes at the bolted end. For circular drilling templates, this value also indicates the default bolt hole orientation in the 3D model. Select "Circular, rotatable" for lap joint flanged ends, and either "Circular, two holes up" or "Circular, one hole up" for all other circular flanged ends.

If a value is not specified, the bolt holes will be assumed to be in a circular pattern (two holes up). The Bolt Circle Diameter property will apply when the drilling template pattern is circular (two holes up, one hole up, rotatable).

Flange Face Projection (Conditionally Required)

Enter the width of any projections that the flange may have, such as raised faces. Include the units of measure, such as **mm** or **in**, when specifying this value. Prior to the 2003 version of ASME B16.5, the flange thickness included the raised face height for Class 300, and lower, flanges; while the Raised Face Height was excluded from the Flange Thickness for Class 400, and higher. However, the minimum flange thickness designation has been changed from C to t_f, and it does not include the 2.0 mm (0.06 in.) Raised Face Height for Class 150 and 300 raised face flanges and flanged fittings, as was the case previously.

Flange Groove Width (Conditionally Required)

Enter the groove width of the bolted end, if applicable to groove flanged ends. This value is required to compute the gasket outside diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange Outside Diameter (Required)

Enter the flange outside diameter for the bolted end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Flange Thickness (Required)

Enter the distance from the outermost flange face to the back surface of the flange on which the nut rests. Include any projections that the flange may have, such as a raised face, only if the manufacturer's data includes any projections or if specified by the standard. The flange thickness should include the thickness of the loose flange used, but not include the wall thickness of the pipe or stub end for lap-flanged ends.

In terms of ASME B16.5 (2003), this value is considered the minimum flange thickness. The tolerance for the minimum flange thickness, if applicable, is defined explicitly in the bolted end generic data. Otherwise, it must be included in the bolt extensions for both stud bolts and machine bolts.

In terms of DIN standards, the flange thickness is determined by a DIN flange standard. However, in some cases the flange thickness is based on the manufacturer or the material. In those cases, you must create a value for the end standard that is unique to the manufacturer and/or the material in order to determine the correct flange thickness, and hence the correct bolt length.

Flange Thickness Tolerance (Optional)

Enter the plus tolerance for the flange thickness. For example, ASME B16.5 (2003) specifies the flange thickness tolerance as 1/8" for NPD 18" and smaller, and a tolerance of 3/16" for NPD 20" and larger. This value is required for computing bolt lengths, when you prefer to express the flange thickness tolerance explicitly and independent of the stud or machine bolt extension. Include the units of measure, such as **mm** or **in**, when specifying this value.

Groove Pitch Diameter (Conditionally Required)

Type the diameter of the ring groove in a ring type joint flanged face. This property is only used for ring type joint flanged ends and is used to determine the compatibility of two dissimilar ring type joint flanged ends at a crossover connection.

Lap Thickness (Conditionally Required)

Type the lap thickness for lap flanged ends. Lap flanged ends are determined by the Termination Subclass property being equal to the numeric equivalent of "Lap flanged"; "Lap flanged, Ring Type Joint"; "Lap flanged, male"; "Lap flanged, female"; "Lap flanged, active"; or "Lap flanged, passive".

This property is not applicable when a stub end has been associated with the lap joint flange as a displayable piping commodity and dimensional data has been specified for the stub end in order to insert both the lap joint flange and the stub end in the model. In that situation, the lap thickness is determined from the piping commodity part data for the stub end.

Nominal Piping Diameter (Required)

Type the nominal piping diameter for the bolted end.

Nominal Diameter Units (Required)

Specify the units for the nominal piping diameter. For example, **mm** or **in**. This unit of measure must be consistent with the port's unit of measure in the piping commodity part data for the piping commodity that references this reference data.

Pressure Rating (Required)

Select the pressure rating for the bolted end.

Quantity of Bolts Required (Required)

Enter the number of bolts required for the bolted end.

Raised Face Diameter (Conditionally Required)

Enter the raised-face diameter of the bolted end, if applicable to raised-face flanged ends. This property also applies to the diameter of small male flange faces and large male flange faces. This value is required to compute the gasket outside diameter and the gasket inside diameter. Include the units of measure, such as **mm** or **in**, when specifying this value.
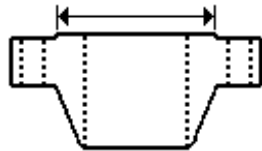
Rating Practice (Required)

Select the pressure rating practice for the bolted end.

Seating Depth (Conditionally Required)

Enter the distance from the outermost surface of the bolted end to the gasket seating surface. This value applies to small groove flanged, large groove flanged, small female flanged, large female flanged, small groove lap flanged, large groove lap flanged, small female lap flanged, large female lap flanged, ring type joint flanged, and mechanical joints. This value represents the groove depth for ring type joint flanged ends. Include the units of measure, such as **mm** or **in**, when specifying this value.

Termination Class (Required)

Select the **Bolted** termination option.

Termination Sub Class (Required)

Select the termination sub class for the bolted end.

DIN Wall Thickness Data

The **DIN Wall Thickness Data** node defines the generic wall thickness data for the DIN industry standard.

First Size (Required)

Enter the first size of the piping commodity.

First Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **First Size** column.

First Size Schedule (Required)

Select the DIN wall thickness Reihe number of the first size end.

First Size Schedule Practice (Required)

Select **Germany Standards (DIN)**.

Geometric Industry Standard (Required)

Select the DIN standard that represents the wall thickness data.

Geometric Industry Practice (Required)

Select **DIN**.

Multi-Size Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (50mm and 25mm) are required in addition to a first size of 150mm and a second size of 100mm, the string that would represent the sizes would be 150x100x50x25. The software interprets the string to determine the second size, the number of sizes in addition to the first size and second size, and the units of measure for each size. The unit of measure for the first size, defined in the **First Size Units** column, is used for the string.

Reinforced Wall Thickness for Port X (Conditionally Required)

Enter the inner wall thickness for each end of the piping commodity, piping specialty, or instrument. Dimensioned as B in the picture.

Second Size (Conditionally Required)

Enter the second size of the piping commodity.

Second Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **Second Size** column.

Second Size Schedule (Conditionally Required)

Select the DIN wall thickness Reihe number of the second size end.

Second Size Schedule Practice (Conditionally Required)

Select **Germany Standards (DIN)**.

Wall Thickness for Port X (Required)

Enter the outer wall thickness for each end of the piping commodity, piping specialty, or

instrument. Dimensioned as A in the picture.
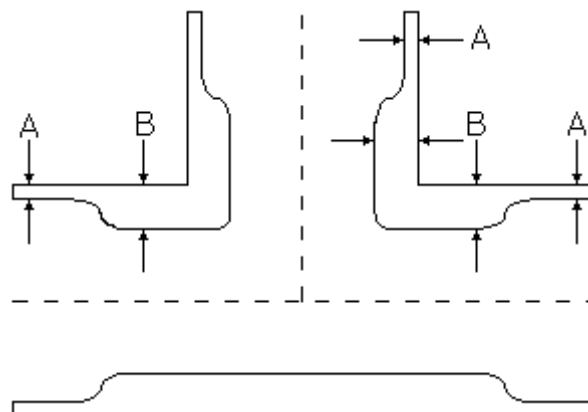
Female End Data

The **Female End Data** node defines generic female end data. The data is determined on the basis of the pressure rating (or schedule), end preparation, end standard, and nominal piping diameter of the female end. The software assumes that the socket depth, as all other female end-specific data, for all female fittings is defined here. If the socket depth is not based on a standard, you must use a value for the end standard property for that female end such that the correct female end generic data can be uniquely identified.

Body Outside Diameter (Optional)

Enter the fitting body outside diameter at the female end. You can specify the body outside diameter in the piping commodity part data (or piping specialty part data or instrument part data) for certain fittings rather than specifying the value here. If you do not enter a value here or in the piping commodity part data (or piping specialty part data or instrument part data), the outside diameter must be available in the plain piping generic data for the same value of the end standard property. Include the units of measure, such as **mm** or **in**, when specifying this value.

End Practice (Required)

Select the end practice for the female end.

End Preparation (Required)

Select the end preparation for the female end.

End Standard (Required)

Select the end standard for the female end.

Hub Outside Diameter (Optional)

Enter the hub outside diameter of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Hub Thickness (Optional)

Enter the hub thickness of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Nominal Piping Diameter (Required)

Type the nominal piping diameter for the female end.

Nominal Diameter Units (Required)

Specify the units for the nominal piping diameter. For example, **mm** or **in**. This unit of measure must be consistent with the port's unit of measure in the piping commodity part data for the piping commodity that references this reference data.

Pressure Rating (Conditionally Required)

Select the pressure rating for the female end. This value is used as the basis of the female end generic data, if the **Schedule** is undefined. In the case of a circular hole end (for example, the non-bolted end of a slip-on flange), the female end generic data should be specified with undefined values for both **Pressure Rating** and **Schedule**.

Rating Practice (Conditionally Required) - Select the pressure rating practice for the female end.

Schedule (Conditionally Required)

Select the thickness schedule for the female end. This value is used as the basis of the female end generic data, if the **Pressure Rating** is undefined. In the case of a circular hole end (for example, the non-bolted end of a slip-on flange), the female end generic data should be specified with undefined values for both **Pressure Rating** and **Schedule**.

Schedule Thickness Practice (Conditionally Required)

Select the schedule practice for the female end.

Socket Diameter (Required)

Enter the socket or thread diameter of the female end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Socket Depth (Conditionally Required)

Enter the depth of socket for the female end. For socket welded ends, the depth of socket should represent the nominal depth of socket less 1/16", which represents the standard engineering practice for the offset between the seat of the socket welded end and the male end of the pipe stock or fitting. In other words, the face-to-center distance for a socket welded fitting is equal to the sum of seat-to-center dimension, the socket depth, and the socket offset. Likewise, the distance from the port to the center is the sum of the seat-to-center dimension and the socket offset. This value also represents the "length through hub" dimension for the non- bolted end of slip-on flanges. Otherwise, the existence of a value for socket depth and socket offset will indicate a socket welded end. Include the units of measure, such as **mm** or **in**, when specifying this value.

Socket Offset (Conditionally Required)

Enter the offset of the socket for the female end. Typically, this value is 1/16". Include the units of measure, such as **mm** or **in**, when specifying this value.

★ **IMPORTANT** Any values defined in the *Socket Offset Rule* (on page 495) will supersede socket offset values defined in this rule.

Socket Wall Thickness (Conditionally Required)

Enter the wall thickness of the socket. If the hub diameter has not been specified, the software computes the hub diameter as the sum of the socket diameter and twice the socket wall thickness.

Termination Class (Required)

Select the **Female** termination option.

Termination Sub Class (Required)

Select the termination sub class for the female end.

Thread Depth (Conditionally Required)

Enter the depth of the thread engagement for the female end. This value should be as precise as possible. The existence of a value here indicates a threaded end to the software. For non-threaded ends, enter **0.00 in**.
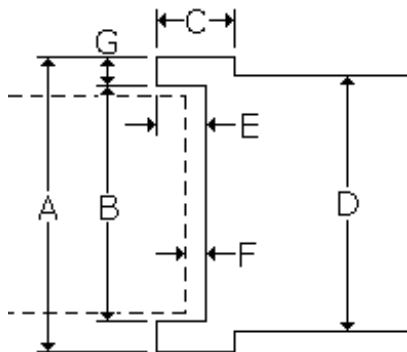
	Socket Welded End	Threaded End
A	Hub Diameter	Hub Diameter
B	Socket Diameter	Thread Diameter
C	Hub Thickness	Hub Thickness
D	Body Outside Diameter	Body Outside Diameter
E	Socket Depth	Thread Depth
F	Socket Offset	*not applicable*
G	Socket Wall Thickness	*not applicable*

Liner Thickness Data Sheet

The **Liner Thickness Data** node defines generic data for liner thicknesses.

Geometric Industry Standard (Required)

Enter the code that represents the manufacturer of the lined fittings.

Lining Material (Required)

Type the code that defines the lining material. Examples of lining material include epoxy, rubber, and plastic.

Liner Thickness at Inside Diameter (Required)

Type the thickness of the lining material at the inside diameter of the piping.

Liner Thickness at Face of Flange (Conditionally Required)

Type the thickness of the lining material at the face of flange.

Nominal Piping Diameter (Required)

Type the nominal piping diameter for the applicable end.

Nominal Diameter Units (Required)

Specify the units for the NPD column. For example, type **mm** or **in**.

Optional Liner Thickness at Face of Flange (Conditionally Required)

Type the optional thickness of the lining material at the face of flange. This is the liner thickness that will be used in the bolt length calculations.

Mechanical End Data

The **Mechanical End Data** node defines generic mechanical end data. The generic data that is required for mechanical ends is based on the specific end preparation. For example, the tangent length is required for extended tangent butt weld (ETBW) types of mechanical fittings. Likewise, the outside diameter and the thickness are required at male Tri-Clamp ends.

Body Outside Diameter (Conditionally Required)

Enter the fitting body outside diameter at the mechanical end. You can specify the body outside diameter in the piping commodity part data (or piping specialty part data or instrument part data) for certain fittings rather than specifying the value here. If you do not enter a value here or in the piping commodity part data (or piping specialty part data or instrument part data), the outside diameter must be available in the plain piping generic data for the same value of the end standard property. Include the units of measure, such as **mm** or **in**, when specifying this value.

End Practice (Required)

Select the end practice for the mechanical end.

End Preparation (Required)

Select the end preparation for the mechanical end.

End Standard (Required)

Select the end standard for the mechanical end.

Groove Depth (Optional)

Enter the groove depth. Include the units of measure, such as **mm** or **in**, when specifying this value.

Groove Width (Optional)

Enter the groove width. Include the units of measure, such as **mm** or **in**, when specifying this value.

Groove Setback (Optional)

Enter the groove setback. Include the units of measure, such as **mm** or **in**, when specifying this value.

Nominal Piping Diameter (Required)

Type the nominal piping diameter for the mechanical end.

Nominal Diameter Units (Required)

Specify the units for the nominal piping diameter. For example, **mm** or **in**. This unit of measure must be consistent with the port's unit of measure in the piping commodity part data for the piping commodity that references this reference data.

Pressure Rating (Conditionally Required)

Select the pressure rating for the mechanical end.

Rating Practice (Conditionally Required)

Select the pressure rating practice for the mechanical end.

Termination Class (Required)

Select the **Mechanical** termination option.

Termination Sub Class (Required)

Select the termination sub class for the mechanical end.
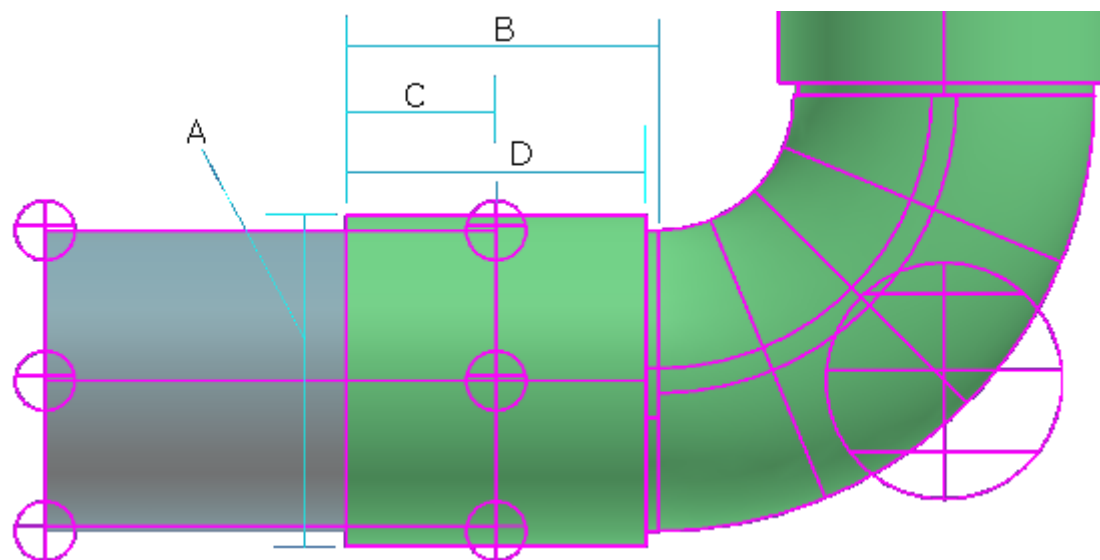
A	Groove Setback
B	Tangent Length
C	Groove Depth
D	Groove Width

Plain Piping Data

The **Plain Piping Data** node defines generic plain piping data. The generic data is required for pipe stock and tubing, including the data required for the conversion of schedule to wall thickness.

NOTE Unless you are using a DIN standard, you must define values for two of these three properties: piping inside diameter, piping outside diameter, and wall thickness.

End Practice (Required)

Select the end practice for the plain piping.

End Standard (Required)

Select the end standard for the plain piping. In the case of the DIN industry standard, this value represents the DIN outside diameter Reihe number for the applicable end.

Nominal Piping Diameter (Required)

Type the nominal piping diameter for the plain piping.

Nominal Diameter Units (Required)

Specify the units for the nominal piping diameter. For example, **mm** or **in**. This unit of measure must be consistent with the port's unit of measure in the piping commodity part data for the piping commodity that references this reference data.

Piping Inside Diameter (Conditionally Required)

Enter the inside diameter at the piping end. If you do not specify a value here, the software calculates the inside diameter as the outside diameter minus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Piping Outside Diameter (Conditionally Required)

Enter the outside diameter at the piping end. If you do not specify a value here, the software calculates the outside diameter as the inside diameter plus two times the wall thickness. Include the units of measure, such as **mm** or **in**, when specifying this value.

Pressure Rating (Conditionally Required)

Select the pressure rating for the plain piping. This value is used to determine the plain piping generic data when nothing is defined for **Schedule**. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Schedule (Conditionally Required)

Select the schedule for the plain piping end. If you do not define a value here, the pressure rating is used to determine the plain piping generic data. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Schedule Practice (Conditionally Required)

Select the schedule practice. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Rating Practice (Conditionally Required)

Select the pressure rating practice for the plain piping.

Wall Thickness (Conditionally Required)

Enter the wall thickness at the piping end. Make sure that you enter this value with full precision (0.3125, not 0.312). If you do not specify a value here, the software calculates the wall thickness as the outside diameter minus the inside diameter divided by two. Include the units of measure, such as **mm** or **in**, when specifying this value. This property is not used by the DIN industry standard, the **End Standard** property is used instead.

Insulation

Topics

Component Insulation Exclusion

The **Component Insulation Exclusion Rule** node helps to eliminate false clashes involving piping and instrument components. This rule identifies conditions under which a component, such as an instrument indicator, is not insulated even though it exists on an insulated line. Additionally, valves, flanges, and unions are typically not insulated for personnel protection. This rule does not have any effect on runs for which Insulation Purpose is set to Undefined.

The components that are not to be insulated are determined on the basis of the piping commodity type; the first size range; the second size range; the Multi-Size Option; the Heat Tracing Requirement (heat traced or not), the Insulation Requirement (hot or cold insulation), and the Insulation Temperature.

The software uses the following convention to determine the temperature to use as the basis of the rule:

- If the piping designer has specified the pipeline insulation temperature, then that insulation temperature is used.

- If the pipeline insulation temperature is undefined, then the heat tracing medium temperature for jacketed piping (the operating temperature of the jacket fluid) is used.

- Otherwise, if the heat tracing medium temperature is undefined, or non-jacketed piping is being used, the temperature is determined on the basis of these case conditions:

- If hot insulation applies, the maximum temperature of the applicable (maximum) case conditions is used.

- If cold insulation applies, the minimum temperature of the applicable (minimum) case conditions is used.

First Size From

Type the smallest size in the first size range for this rule.

First Size To

Type the largest size in the first size range for this rule.

First Size Units

Type the units of measurement for the first size values. For example, type **in** or **mm**.

Heat Tracing Medium

Select the heat-tracing medium to which the rule applies.

Heat Tracing Type

Select the heat-tracing type to which the rule applies.

Heat Tracing Requirement

Select the heat-tracing requirement to which the rule applies.

Insulation Purpose

Select the insulation purpose to which the rule applies.

Insulation Type

Select the insulation type to which the rule applies.

Insulation Requirement

Select the insulation requirement to which the rule applies.

Insulation Temperature From

Specify the lowest temperature in the temperature range to which the rule applies.

Insulation Temperature To

Specify the highest temperature in the temperature range to which the rule applies.

Multi-Size Option

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column, is used.

Piping Commodity Type

Specify the commodity type for which you are defining a rule.

Piping Commodity Sub Class

Select the piping commodity sub class.

Piping Commodity Class

Select the piping commodity class.

Second Size From

Type the smallest size in the second size range for this rule.

Second Size To

Type the largest size in the second size range for this rule.

Second Size Units

Type the units of measurement for the second size values. For example, type **in** or **mm**.

Pipe Stock

The **Pipe Stock** node defines the pipe parts that you want in your catalog.

NOTE Although Pipe Stock looks like a standard part class, it is in fact a system class. Therefore, any custom attributes that you want to add to the Pipe Stock class need to be made using the **Custom Class Interface List** sheet. For more information about custom interfaces, see the main Reference Data Guide.

Commodity Type

Type the piping commodity type short description or the corresponding codelist value. Valid codes and short descriptions are listed in the **AllCodeLists.xls** workbook on the **PipingCommodityType** sheet in the **Codelist Number** column.

Density

Specify the material density including the units, for example: **490lbm/ft^3** or **7856kg/m^3**.

Dry Weight per Unit Length (Optional)

Enter the dry weight (empty or shipping weight) of the pipe stock or tubing per unit length. This represents the dry weight per unit length for the pipe barrel of flanged or mechanical joint pipe.

Dry Weight for End 1 (Optional)

Enter the dry weight (empty or shipping weight) of end 1 of the pipe stock, if not plain end piping.

Dry Weight for End 2 (Optional)

Enter the dry weight (empty or shipping weight) of end 2 of the pipe stock, if not plain end piping.

End Preparation

Enter the end preparation code for the part port. Valid codes are listed in the **AllCodeLists.xls** workbook on the **EndPreparation** sheet in the **Codelist Number** column.

End Standard (Required)

Enter the end standard code for the part port. Valid codes are listed in the **AllCodeLists.xls** workbook on the **EndStandard** sheet in the **Codelist Number** column.

Geometric Industry Standard (Required)

Enter the code that represents the source used in the preparation of the catalog data applicable to the pipe stock.

Graphical Representation Or Not

Specify whether or not the part should appear in the model.

Industry Commodity Code

Type a commodity code for the pipe. The software uses this commodity code to find the pipe in the parts catalog. This code must be unique across the catalog.

Lining Material

Type the code that defines the lining material, if any, for the part. Examples of lining material include epoxy, rubber, and plastic. Valid codes are listed in the **AllCodeLists.xls** workbook

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on the **LiningMaterial** sheet in the **Codelist Number** column.

Manufacturing Method

Enter the optional manufacturing method code for the pipe. Valid codes are listed in the **AllCodeLists.xls** workbook on the **ManufacturingMethod** sheet in the **Codelist Number** column.

Material Grade

Enter the material grade code for the part. Valid codes are listed in the **AllCodeLists.xls** workbook on the **MaterialGrade** sheet in the **Codelist Number** column.

Maximum Pipe Length

Specify the maximum pipe length which can be purchased including the units, for example: **20ft**. See **Purchase Length** below for more information.

Minimum Pipe Length

Specify the minimum pipe length which can be purchased including the units, for example: **8.5in**. See **Purchase Length** below for more information.

NPD (Required)

Type the nominal piping diameter for the end. If both ends have the same NPD, you still must enter the same NPD value in both the **NPD[1]** and **NPD[2]** columns.

NPD Unit Type (Required)

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping note 1

Specify the standard notes that you want to associate with the pipe stock.

Pressure Rating (Optional)

Enter the pressure rating short description for the part port. Valid short descriptions are listed in the **AllCodeLists.xls** workbook on the **PressureRating** sheet in the **PressureRating ShortDescription** column.

Purchase Length

Specifies the pipe length to use when computing lengths of purchase length pipe (for example, flanged lined pipe or ductile iron mechanical joint pipe.) This pipe is typically purchased in a fixed length, for example, 20 feet. In some cases, the manufacturer provides a minimum length and a maximum length which you can set in the **Maximum Pipe Length** and **Minimum Pipe Length** cells. If specified, these lengths are used in the algorithm for computing the quantity and lengths of purchase length pipe for a given spool.

Be sure to include the units, for example **6m** or **20ft**. If you do not specify a purchase length, the software uses the **Maximum Pipe Length** value for the purchase length.

Schedule Thickness (Optional)

Type the schedule thickness short description for the part port. Valid codes and short descriptions are listed in the **AllCodeLists.xls** workbook on the **ScheduleThickness** sheet in the **Schedule Thickness Short Description** column.

Surface Preparation

Enter the optional surface preparation code for the pipe. Valid codes are listed in the **AllCodeLists.xls** workbook on the **SurfacePreparation** sheet in the **Codelist Number**

column.

Water Weight per Unit Length (Optional)

Enter the water weight of the pipe stock or tubing per unit length. However, this value is computed automatically in most cases and it is not always necessary for the specification writer to enter a value for the water weight per unit length. By definition, the water weight represents the sum of the dry weight (empty or shipping weight) and the weight of water within the fitting (pipe stock in this case).

The weight of water is computed automatically as the product of the density of water and the volumetric capacity per unit length, where the volumetric capacity per unit length of the pipe stock or tubing is computed as the product of the unit length and the cross-sectional area of the opening in the pipe stock, as represented by the difference between the outside diameter and the wall thickness, or as the product of the unit length and the cross-sectional area represented by the inside diameter.

Weight Per Unit Length

Specify the weight per unit length of the pipe, for example: **1.68lbm/ft** or **28.6lbm/ft**. You should specify the weight per unit length if you do not specify a density value.

Pipe Bending Data

The software can check pipe bends as they are modeled to ensure that they have adequate lengths for fabrication on an allocated bending machine. The bending manufacturability rules define the bending machine for the material class, the nominal size, the type of bend. You also define the grip, pull, and bend-to-bend lengths based on the bending machine, material, NPD, and pipe wall thickness. You should customize the rules based on what makes sense for your company.

The pipe bending manufacturability rules are delivered in the **Pipe Bending Manufacturability Rules.xls** workbook in the *[Product Folder]*\CatalogData\BulkLoad\SampleDataFiles folder on your server. You must bulk load the workbook.

What do you want to do?

- *Define Pipe Bending Machines* (on page)

- *Define Pipe Bending Die Data* (on page)

- *Define Pipe Bending Minimum Tangent Length Data* (on page)

- *Define Pipe Bending Configuration Data* (on page)

Pipe Bending Die Data

The **Pipe Bending Die Data** node   defines die data for pipe bending machines.

Absolute Pipe Bend Radius (Optional)

Type the largest pipe bend radius for the die.

Default Minimum Tangent Length Between Bends (Optional)

Enter the minimum distance between two bends that the die can produce. You can enter zero. This value is used as the minimum tangent length between bends when you do not define the minimum tangent length in the minimum bend-to-bend tangent length data on the basis of the bend type.

Minimum Grip Length (Required)

Enter the minimum grip length for the die. You can enter zero length if applicable. This length overrides the applicable value from the Minimum Pipe Length rule.

Minimum Pull Length (Required)

Enter the minimum pull length for the die. You can enter zero length if applicable. This length overrides the applicable value from the Minimum Pipe Length rule.

Nominal Piping Diameter (Required)

Enter the die NPD.

Nominal Piping Diameter UOM (Required)

Specify the units of measurement, for example **in** or **mm**, for the **Nominal Piping Diameter** column.

Pipe Bend Radius Multiplier (Optional)

Type the pipe bend radius multiplier that apply to this die.

Pipe Bending Machine Name (Required)

Enter the bending machine code for which you are defining die data. The bending machines codes are defined in the **Pipe Bending Machine Name** column on the **PipeBendingMachineData** sheet. The sheet is located in the **Pipe Bending Manufacturability Rules.xls** workbook.

See Also
Pipe Bending Data

Pipe Bending Machine Data

The **Pipe Bending Machine Data** node defines the pipe bending machines that are available.

Height Above Shop Floor (Optional)

Enter the distance to the floor. This value will be used to calculate if the pipe will hit the floor when being bent.

Maximum Bend Angle (Optional)

Enter the maximum bend angle that the bending machine can create.

Maximum Capacity (Optional)

Enter the maximum outside pipe diameter that the bending machine can handle.

Maximum Centerline Radius (Optional)

Enter the maximum distance from the center of curvature to the centerline axis of the tube or pipe bend that the bending machine can handle.

Maximum Number of Bends (Optional)

Enter the maximum number of bends that the bending machine can handle.

Maximum Pipe Length (Optional)

Enter the maximum pipe length that the bending machine can handle.

Maximum Section Modulus (Optional)

Enter the maximum section modulus that the bending machine can create.

Minimum Bend Angle (Optional)

Enter the minimum bend angle that the bending machine can create.

Pipe Bending Machine Name (Required)

Type a code number for the bending machine code that you are defining. Each bending machine that you define must have a unique number.

Pipe Bending Machine Description (Optional)

Type a description of the bending machine, such as the manufacturer and the model number.

Pipe Bending Machine Type (Optional)

Specify the correct codelist value that defines the bending machine type (cold form pressure, ram, roll, and so forth).

See Also
Pipe Bending Data (on page 200)

Pipe Bending Minimum Tangent Length Data Sheet

The **Minimum Bend-to-Bend Tangent Length Data** node defines the minimum tangent length data for varies bend types on pipe bending machines.
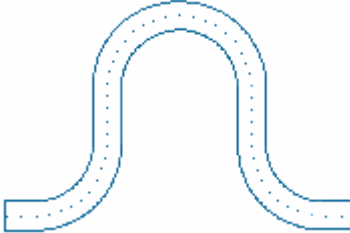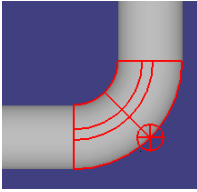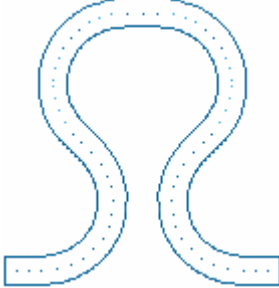
Pipe Bending Machine Name (Required)

Enter the bending machine code for which you are defining minimum tangent length data. The bending machines are defined in the **Pipe Bending Machine Data** node.

Pipe Bend Type (Required)

Select the pipe bend type for which you want to define minimum tangent length data.

Codelist	Name	Bend Type
1	Angle Bend <45°	
2	Angle Bend 45°	
3	Angle Bend >45° <90°	
4	Quarter Bend	
5	Offset Bend	
6	U-Bend	
7	Angle Bend >90° <180°	

Codelist	Name	Bend Type
8	Single Offset Quarter Bend	
9	Crossover Bend	
10	Single Offset U-Bend	
11	Expansion U-Bend	
12	Double Offset U-Bend	
13	Double Offset Expansion U-Bend	

Minimum Bend to Bend Tangent Length Option (Optional)

Provides the ability to specify both standard and non-standard minimum bend-to-bend tangent lengths for each type of pipe bend configuration. This option provides alternate minimum tangent lengths on the same bending machine, similar to the commodity option in

the piping commodity filter. In this column, enter:

0 to define the row as the standard bend-to-bend tangent lengths

- 1 to define the row as the first set of alternate lengths
- 2 to define the row as the second set of alternate lengths

Nominal Piping Diameter (Required)

Enter the NPD for which to define minimum tangent lengths.

Nominal Piping Diameter UOM (Required)

Specify the units of measurement, for example **in** or **mm**, for the **Nominal Piping Diameter** column.

Pipe Bend Radius Multiplier (Optional)

Type the pipe bend radius multiplier for which the **Minimum Bend to Bend Tangent Length Option** applies.

Minimum Tangent Length Between Turn 12

Enter the minimum tangent length between turns 1 and 2 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 23

Enter the minimum tangent length between turns 2 and 3 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 34

Enter the minimum tangent length between turns 3 and 4 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 45

Enter the minimum tangent length between turns 4 and 5 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 56

Enter the minimum tangent length between turns 5 and 6 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 67

Enter the minimum tangent length between turns 6 and 7 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Minimum Tangent Length Between Turn 78

Enter the minimum tangent length between turns 7 and 8 that is required for the pipe bending machine. You can enter zero, which represents either a tangent with no length or the non-existent tangent between two turns that are required to represent a single bend, when the nominal bend angle exceeds 90 degrees. This tangent length is used instead of the applicable Minimum Pipe Length value in the piping specification.

Optional Minimum Grip Length (Optional)

Enter the minimum grip length required for the pipe bend configuration. This grip length value will override the value in the pipe bending die data.

Optional Minimum Pull Length (Optional)

Enter the minimum pull length required for the pipe bend configuration. This pull length value will override the value in the pipe bending die data.

See Also
Pipe Bending Data (on page 200)

Pipe Bending Configuration Data

The **Pipe Bending Configuration Data** node defines characteristics of pipe bend configurations in terms of its bend angles and rotations. The configuration data is limited to eight turns.

Is Bend Planar

Specifies whether or not the center line of a pipe bend configuration lies within a single plane. Enter **1** if the bend is planar. Enter **2** if the centerline of pipe bend lies in two or more planes.

Nominal Bend Angle From 1

Enter turn 1's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 1

Enter turn 1's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 2

Enter turn 2's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 2

Enter turn 2's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 2

Enter turn 2's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 2

Enter turn 2's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 3

Enter turn 3's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 3

Enter turn 3's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 3

Enter turn 3's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 3

Enter turn 3's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 4

Enter turn 4's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 4

Enter turn 4's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 4

Enter turn 4's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 4

Enter turn 4's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 5

Enter turn 5's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 5

Enter turn 5's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end"

towards the "pull end".

Nominal Bend Angle From 5

Enter turn 5's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 5

Enter turn 5's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 6

Enter turn 6's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 6

Enter turn 6's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 6

Enter turn 6's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 6

Enter turn 6's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 7

Enter turn 7's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 7

Enter turn 7's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 7

Enter turn 7's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 7

Enter turn 7's bend angle upper limit, in degrees, for the pipe bend configuration.

NonPlanar Rotation Angle From 8

Enter turn 8's non-planar rotation lower limit, in degrees, if applicable, for the pipe bend configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

NonPlanar Rotation Angle To 8

Enter turn 8's non-planar rotation upper limit, in degrees, if applicable, for the pipe bend

configuration. This value provides the turn's rotation out of the centerline plane and follows the right-hand rule based upon the direction from the pipe bend configuration's "grip end" towards the "pull end".

Nominal Bend Angle From 8

Enter turn 8's bend angle lower limit, in degrees, for the pipe bend configuration.

Nominal Bend Angle To 8

Enter turn 8's bend angle upper limit, in degrees, for the pipe bend configuration.

Pipe Bend Type

Enter the codelist value of the pipe bend type for which you want to define configuration data.

Bend To Bend Tangent Basis

Specifies how you want to measure the minimum tangent length between bend dimensions. This setting determines how the minimum bend-to-bend tangent lengths from the Pipe Bending Die Data and the minimum bend-to-bend tangent length data are interpreted by the software.

- Enter **1** if the tangent length data is from turn point to turn point.
- Enter **2** if the tangent length data is from tangent point to tangent point.

See Also
Pipe Bending Data (on page 200)

Piping Commodity Service Limits

The **Piping Commodity Service Limits Data** node defines the maximum temperature and pressure for a piping commodity, stock piping specialty, or stock instrument. This specification is especially needed when the maximum pressure or temperature for the object is not suitable for the full range of temperatures and pressures for which the applicable piping material class is intended.

The software considers these limits when the **Selection Basis** option for the commodity is set to "Fitting requires validation of commodity-specific Service Limits rule" or "Fitting plus reportable piping commodity requiring validation of commodity-specific Service Limits rule" in the **Piping Commodity Filter**.

For clamps, the software considers these limits when the **Clamp Selection Basis** option is set to "Clamp requires clamp- specific service Limits validation" or "Clamp and implied gasket require clamp-specific service limits validation" in the **Clamp Selection Filter**.

For stock instruments, the software considers these limits when the **Requisition Type** option is set to "Stock with validation" in the **Stock Instruments, Generic Tag Number** or **Stock Instruments, Unique Tag Number**.

For stock piping specialties, the software considers these limits when the **Requisition Type** option is set to "Stock with validation" in the **Stock Piping Specialties, Generic Tag Number** or **Stock Piping Specialties, Unique Tag Number**.

First Size (Required)

Specifies the size or thickness of the piping commodity for which you want to define service limits. This box is not required if the commodity code includes a schedule.

First Size Units (Required)

Specifies the units, **mm** or **in** for example, for the value you entered in the **First Size** column.

First Size Schedule (Optional)

Specifies the schedule practice code for the first size.

Industry Commodity Code (Required)

Specifies the industry commodity code of the object for which you are defining a service limit.

Industry Commodity Code Gasket (Optional)

Specifies the optional industry commodity code, if different from the contractor's or client's commodity code, for a gasket that is associated with a clamp. This commodity code can be size-independent or size-dependent. Usually, the service limits data for a clamp is dependent on the gasket type and the gasket material, which are defined in the gasket's commodity code.

Maximum Pressure (Required)

Specifies the maximum pressure for which this piping commodity, stock piping specialty, or stock instrument is intended. Include the units for measure, **psi** for example, when specifying this value.

Maximum Temperature (Required)

Specifies the maximum temperature for which this piping commodity, stock piping specialty, or stock instrument is intended. Include the units of measure, **F** or **C** for example, when specifying this value.

Multisize Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate. For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size, the number of sizes in addition to the first size and second size. The unit of measure for the first size, defined under **First Size Units**, is used for the string.

Second Size (Conditionally Required)

Specifies the size or thickness of the piping commodity for which you want to define service limits. This box is not required for piping commodities, stock piping specialties, or stock instruments with size-dependent commodity codes.

Second Size Units (Conditionally Required)

Specifies the units, **mm** or **in** for example, for the value you entered in the **Second Size** column.

Second Size Schedule (Optional)

Specifies the schedule practice code for the second size.

Piping Specification

Topics

Instrument Class Data

The **Instrument Class Data** node defines the instrument class data. This data is based on size range and does not vary per piping materials class.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity.

Bolting Requirements (Optional)

Select the bolting requirement for the piping commodity. The following options are available:

- **Undefined** - The bolting requirement is undefined.

- **Bolting required** - The piping commodity requires a reportable set of bolts determined by the bolted joint, but based on a special bolt extension option. If you select this option, you must define the **Bolt Extension Option**.

- **Complete substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of threaded holes to match the drilling template applicable to the mating flange.

- **Complete substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of the bolted joint. Cap screws (or tap end stud bolts) are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the

bolted joint. Use this option when the through-bolted fitting includes a complete set of tapped holes to match the drilling template applicable to the mating flange.

- **Partial substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for threaded holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of threaded holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are threaded.

- **Partial substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of tapped holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are tapped.

- **Bolts supplied with nozzle and not to be reported** - The piping commodity is supplied with the necessary bolts included, such that the applicable bolts should not be reported.

- **Reportable bolts not required** - A set of bolts is not applicable to any end of this piping commodity because all ends are non-bolted. This option is the default for any piping commodity without any bolted ends.

- **Complete substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of threaded holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Complete substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of tapped holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Partial substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This option represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the

situation where the smaller end of a reducing flange includes a partial set of threaded holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of the reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are threaded. This option is not available for nozzles.

▪ **Partial substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This will address the situation where the smaller end of a reducing flange includes a partial set of tapped holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of a reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are tapped. This option is not available for nozzles.

▪ **Complete cap screw substitution for full threaded and tapped holes for each bolted end** - Each bolted end requires a reportable set of substitution cap screws for full threaded holes and also tapped holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation. In other words, this represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the through-bolted fitting includes a complete set of threaded holes and also tapped holes to match the drilling template applicable to the companion flange. This can be required, as an example, for a larger size asymmetrical lug body butterfly valve where tapped holes are required near the valve stem. This option is not available for nozzles.

📝 NOTES

▪ Any through-bolted joint, where the Termination Subclass for one of the bolted ends indicates through-bolted end with bolt holes, but the Bolting Requirement property for the fitting at that same bolted end indicates a complete substitution of cap screws (or tap end stud bolts), the software considers it to be a bolted joint, not a through-bolted joint.

▪ Although two or more through-bolted fittings may be involved in forming a through-bolted connection, the software assumes that only one through-bolted fitting exists for any situation where either complete substitution or partial substitution with cap screws (or tap end stud bolts) applies. Furthermore, whenever two or more through-bolted fittings form a through-bolted connection, the software assumes that the bolts extend through all of the through-bolted fittings.

Cap Screw Engagement Gap (Conditionally Required)

Specify the total gap between the cap screw ends inserted into each threaded hole end. The engagement gap is used in the bolt length calculations for cap screws in threaded holes. Use this field when an engagement gap that is unique to a component is needed.

This engagement gap value is used for all cap screw diameters regardless of the cap screw diameter or the nominal piping diameter for the valve, or fitting, requiring the cap screws. If you do not specify a value here, then the default value for the piping specification is used.

Clamp Requirement (Conditionally Required)

Select whether or not the commodity requires a clamp if one or more mechanical ends apply. This option overrides the clamp query in the clamp selection filter when the value of

the Termination Subclass is set to "Mechanical joint with clamp" or "Mechanical joint with clamp and hub or ferrule".

Contractor Commodity Code (Conditionally Required)

Specifies the contractor commodity code, which is the commodity code that is used during the design phase.

NOTE The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size- independent or size-dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule or neither must include a schedule.

Corrosion Allowance (Optional)

Specify the corrosion allowance for the instrument. This value is used in the calculation of the wall thickness. Include the units of measurement, **in** or **mm** for example, when specifying this value.

Fabrication Type (Conditionally Required)

Type the fabrication code.

First Size From (Required)

Defines the lower bound of the largest nominal piping diameter for which this instrument applies.

First Size Schedule (Conditionally Required)

Specifies the short description that represents the schedule (or thickness) for the first size end of this instrument. This data is required only when the commodity code does not include schedule.

First Size To (Required)

Defines the upper bound of the largest nominal piping diameters for which this instrument applies.

First Size UOM Basis In Catalog (Conditionally Required)

Specifies the units of measure basis code.

First Size Units (Required)

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Gasket Requirements (Conditionally Required)

Specifies the code that represents the instrument gasket requirements.

Generic Tag Number

Specifies a generic tag number for the instrument. A generic tag number is used for "off the shelf" instruments.

Geometric Industry Standard (Required)

Specifies the code that represents the source used in the preparation of the catalog data applicable to the instrument.

Geometry Type (Required)

Type the geometry type code.

Hyperlink To Electronic Vendor (Optional)

Type the URL address to the electronic vendor catalog.

Instrument Type (Conditionally Required)

Specifies codelist number of the instrument.

Is Graphical Representation

Specify whether the instrument appears in the model.

Lining Material (Optional)

Type the code that defines the lining material, if any, for the instrument. Examples of lining material include epoxy, rubber, and plastic.

Localized Short Material Description (Optional)

Type a description for the material. The software uses this description in the bill-of- materials part of isometric drawings when construction personnel require a different language than what was used in the **Short Material Description** box.

Long Material Description (Optional)

Type a description for the material to use when requisitioning.

Loose Material Requirements (Optional)

Specifies the code that represents the loose material requirements for the instrument.

Manufacturer (Optional)

Specifies the code that represents the manufacturer of the instrument. This property is optional, but can be used to track the manufacturer for reporting.

Material Grade (Optional)

Specifies the material grade code for the instrument.

Maximum Pressure (Optional)

Specifies the maximum pressure for which this instrument is intended. Include the units for measure, **psi** for example, when specifying this value.

Maximum Temperature (Optional)

Specifies the maximum temperature for which this instrument is intended. Include the units of measure, **F** or **C** for example, when specifying this value.

Mirror Behavior Option (Conditionally Required)

Specifies the code that represents the mirror behavior for the instrument.

Multisize Option (Conditionally Required)

Type a string to represent an optional instrument selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size, the number of sizes in addition to the first size and second size. The unit of measure for the first size, defined in the **First Size Units** column, is used for the string.

📝 NOTE You can append the keywords **Primary** (primary size) and **Secondary**

(secondary size) to the column headings for the nominal piping diameters at each end in the workbook for the part data to assign the size to a specific piping point instead of using the **Multisize Option** property. Fittings that require two sizes will be assumed to have the primary size assigned to the first piping point and the secondary size assigned to the second piping point. Multi-size fittings with three or more sizes must have the sizes assigned to the appropriate piping points by means of the multi-size option property. Fittings with exactly two sizes and three or more piping points may have the size assigned to the appropriate piping point by using these keywords.

Part Data Basis (Optional)

Specifies the code that represents the basis of the dimensional data defined in the piping instrument part data. Set this value to recognize those components that require special treatment in terms of interpreting the symbol dimensional data. For example, the symbol is designed on the basis of a face-to-face dimension. However, the manufacturer provides the face-to-center dimension. The symbol can be designed to react accordingly on the basis of the value of this property.

Piping Note 1 (Optional)

Specify the standard notes that you want to associated with the specialty. Standard notes are defined in the Piping > Piping Specification > Notes node.

Quantity of Alt Reportable Parts (Optional)

Specifies the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts (Optional)

Type the number of objects to be reported per instance of the piping specialty item. This value must be an integer.

Reportable Commodity Code (Optional)

Type the commodity code of the instrument that you want created with the primary commodity code item. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here.

Reporting Type (Conditionally Required)

Type the reporting requirements code for the instrument. You can specify that the commodity is reported or not reported. An example of an instrument that you may not want reported is a spacer for a valve. You have to order the valve, but the spacer comes with the valve and does not need to be ordered.

Requisition Type (Required)

Type the requisition type code. If you set this option to "Stock with validation", then the software uses the commodity specific service limits that are define in *Piping Commodity Service Limits* (on page 340).

Second Size From (Conditionally Required)

Defines the lower bound of the next largest nominal piping diameter for which this instrument applies.

Second Size Schedule (Conditionally Required)

Specifies the short description that represents the schedule (or thickness) for the second size end of this instrument. This data is required only when the commodity code does not include schedule.

Second Size To (Conditionally Required)

Defines the upper bound of the next largest nominal piping diameters for which this instrument applies.

Second Size UOM Basis In Catalog (Conditionally Required)

Specifies the units of measure basis code.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Short Material Description (Required)

Type a description for the material. The software uses this description in the bill-of-materials part of isometric drawings, for reporting, and for visual feedback to the piping designer for design, construction, and fabrication.

Spec Name

Specify the piping materials class name.

Subst Cap Screw Contractor Comdty Code (Optional)

Type the contractor commodity code for the replacement cap screws.

Subst Cap Screw Diameter (Optional)

Type the diameter of the cap screw including the units. For example, type **0.5in** or **1in**.

Subst Cap Screw Quantity (Optional)

Type the number of machine bolts or studs that are being replaced by cap screws at each bolted end of the instrument.

For non-through bolted fittings, the number of cap screws to substitute for machine bolts or studs required by the drilling template is the same as the number of machine bolts or studs being replaced.

For through bolted fittings with threaded holes, the number of cap screws required is twice the number of machine bolts or studs being replaced.

This value is not required when all bolts defined by the drilling template are replaced by cap screws.

Supply Responsibility (Optional)

Specifies the code that represents the person responsible for supplying the object.

Tag Number (Conditionally Required)

Specifies a tag number for the instrument. Tag number is used for specific, one-of-a-kind instruments.

Tapped Hole Depth (Optional)

Type the depth of the tapped hole in the valve or fitting that requires substitution cap screws,

including the unit. This value is not required for substitution cap screws at threaded holes.

Tapped Hole Depth 2 (Conditionally Required)

Type the depth of the tapped hole at port two of an asymmetrical valve or fitting that requires substitution cap screws (or substitution tap end stud bolts), if applicable. For example, a lug body butterfly valve requires different length cap screws on the basis of the applicable end of the valve.

Valve Operator Catalog Part Number (Conditionally Required)

Type the unique identification for the valve operator as found in the catalog data and the material control data.

Valve Operator Geometric Ind Std

Specifies the code that represents the source used in the preparation of the catalog data applicable to the valve operator.

Valve Operator Type (Conditionally Required)

Specifies the code that represents the specific type of valve operator, actuator, or appurtenance.

Vendor (Optional)

Specifies the code that represents the vendor that is supplying the instrument. This property is optional, but can be used to track the vendor for reporting.

Welding Requirements (Conditionally Required)

Specifies the code that represents the welding requirements for the instrument.

See Also

Multiport Valve Operator Data

The **Multiport Valve Operator Data** node defines the operator data for each port of a multiport valve. This information is used when the **Multiport Valve Op Req** column in the *Piping Commodity Material Control Data* (on page 356) specifies that multiport operators are required.

Contractor Commodity Code (Required)

Enter the contractor commodity code, which is the commodity code that is used during the design phase.

📄 **NOTE** The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size-independent or size-dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule or neither must include a schedule.

First Size From (Required)

Defines the lower bound of the largest nominal piping diameter for which this operator applies.

First Size To (Required)

Defines the upper bound of the largest nominal piping diameters for which this operator applies.

First Size Units (Required)

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Multisize Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. The unit of measure for the first size, defined in the **First Size Units** column, is used for the string.

Port Number (Required)

Specify the port number on the valve for which the valve operator or actuator applies.

📄 **NOTE** This value is the port number in reference to the symbol. For example, in most manufacturers' catalogs a 5- way diverter valve has the outlet ports numbered 1 through 5. However, most symbols designate 1 as the inlet port. In which case, the outlet ports would be 2 through 6. The port number that you define here is relative to the symbol port numbers. For more information about symbols, refer to the *Smart 3D Reference Data Guide.*

Second Size From (Conditionally Required)

Defines the lower bound of the next largest nominal piping diameter for which this operator applies.

Second Size To (Conditionally Required)

Defines the upper bound of the next largest nominal piping diameters for which this operator applies.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Valve Operator Geometric Ind Std (Optional)

Enter the code that represents the source used in the preparation of the catalog data applicable to the valve operator.

Valve Operator Number (Required)

Type the unique identification for the valve operator as found in the catalog data and the material control data.

Valve Operator Type (Required)

Enter the code that represents the specific type of valve operator, actuator, or appurtenance.

NOTE You can specify valve accessories using the **Port Number** and **Valve Operator Type**. The **Port Number** value represents the valve port number for which the valve operator or actuator applies. The valve port number can also be used to specify one or more valve accessories for each valve operator or valve actuator. Because the port number must uniquely identify the mounting location of the applicable valve accessory, the port number for a valve accessory must be specified using the following formula:

```
Accessory Port Number = (Operator/actuator Port Number * 100) +
mounting location number
```

Where the mounting location is specified for each valve operator or valve actuator. The mounting location number is a value of 1 or 2 as indicated by the following figure:

Front View
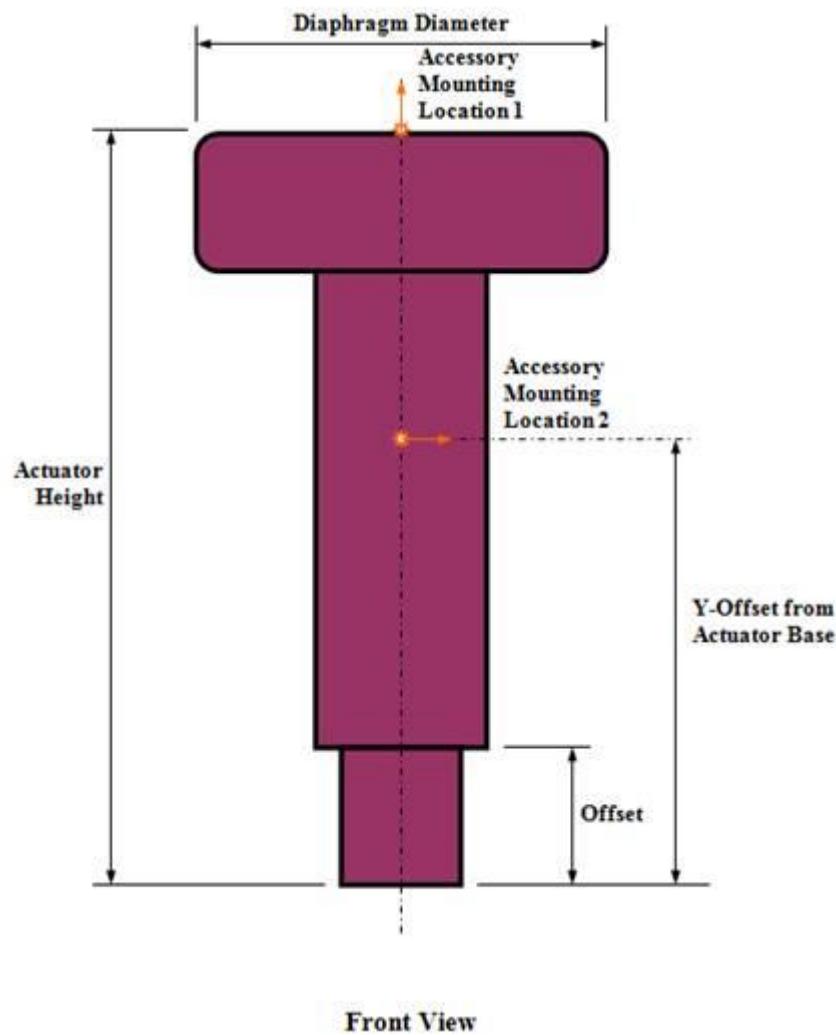
In the following example, the gearbox is the operator and is set to 1. The chainwheel is the accessory, so its value is set to 101 according to the formula.

ContractorCommodityCode	FirstSizeFrom	FirstSizeTo	FirstSizeUnits	SecondSizeFrom	SecondSizeTo	SecondSizeUnits	MultiSizeOption	PortNumber	ValveOperatorType	ValveOperatorGeoIndStd	ValveOperatorNumber
VAKAHABZZZZZZZZZJPZZUM	2	2	in					1	331	GearboxOp	Operator - port number: 1
VAKAHABZZZZZZZZZJPZZUM	2	2	in					101	200	ChainwheelAssemblyType03	Accessory – port number: 1 * 100 + 1

Valve Symbol

The following methods are available to support valve symbols.

- **GetValveOperatorsForPorts** - Retrieves the valveoperator collection for multi-operator cases.

- **GetValveOperatorPartPerPort** - Retrieves the valveoperator part given the port number for multi-operator cases.

- **SetMultiPortValveAccColl** - Sets the partnumber on the specified port number for multi-operator cases.

The following example shows the valve symbol:

```
'***********************************************************************************************************
    'Operator
    '***********************************************************************************************************
    'Insert your code for output 7 (Valve Operator)
    Dim oSymbolHelper As IJSymbolGeometryHelper
    Set oSymbolHelper = New SP3DSymbolHelper.SymbolServices
    oSymbolHelper.OutputCollection = m_OutputColl

    Dim oDirX As IJDVector
    Dim oDirY As IJDVector
    Dim oDirZ As IJDVector

    Set oDirX = New DVector
    Set oDirY = New DVector
    Set oDirZ = New DVector

    oDirX.Set Cos(parHandwheelAngle), 0, Sin(parHandwheelAngle)
    oDirY.Set 0, 1, 0
    oDirZ.Set -Sin(parHandwheelAngle), 0, Cos(parHandwheelAngle)

    Dim oOperatorPart As IJDPart
    Dim oOperatorOcc As IJPartOcc
    Dim oVlvPart As GSCADRefDataPipingSpec.IJValveOperator

    If Not oPipeComponent Is Nothing Then
        On Error Resume Next
        If oPipeComponent.GetMultiPortValveOperatorRequirement = 5 Then
            On Error GoTo ErrorLabel
            Set oOperatorPart = oPipeComponent.GetValveOperatorPart
        ElseIf oPipeComponent.GetMultiPortValveOperatorRequirement = 10 Then
            On Error GoTo ErrorLabel
            Dim oMultiValCol As IJMultiPortValveAccCol
            Dim strPartNumber As String
            Dim lPortNumber As Long
            oPipeComponent.GetValveOperatorsForPorts oMultiValCol
            If Not oMultiValCol Is Nothing Then
                 lPortNumber = 1
                strPartNumber = oPartFclt.PartNumber
                Set oOperatorPart = oMultiValCol.GetValveOperatorPartPerPort(lPortNumber)
                If Not oOperatorPart Is Nothing Then
                    Set oVlvPart = oOperatorPart
                    Call oVlvPart.SetMultiPortValveAccCollInfo(lPortNumber, strPartNumber)
                    If Not oOperatorPart Is Nothing Then
                        Set OpOrigin = New DPosition
                        OpOrigin.Set 0, 0, 0
                        oDirX.Set Cos(parHandwheelAngle), 0, Sin(parHandwheelAngle)
                        oDirY.Set 0, -1, 0
                        oDirZ.Set Sin(parHandwheelAngle), 0, -Cos(parHandwheelAngle)
                        Set oOperatorOcc = oSymbolHelper.CreateChildPartOcc("ValveOperator", oOperatorPart, OpOrigin,
oDirX, oDirY, oDirZ)
                        Set oIJDEditJDArgument = GetIJDEditJDArgument(oOperatorOcc)

                        'Offset from Valve Center line
                        UpdateOperatorAttributes oOperatorOcc, "IJUAOffsetFrmValCen", _
                                                "OffsetFrmValCen", parOffsetfrmValCen, oIJDEditJDArgument

                        Set oIJDInputsArg = oOperatorOcc
                        oIJDInputsArg.Update
                     End If
                    Set oVlvPart = Nothing
                End If
                lPortNumber = 2
                strPartNumber = oPartFclt.PartNumber
                Set oOperatorPart = oMultiValCol.GetValveOperatorPartPerPort(lPortNumber)
                If Not oOperatorPart Is Nothing Then
                    Set oVlvPart = oOperatorPart
                    Call oVlvPart.SetMultiPortValveAccCollInfo(lPortNumber, strPartNumber)
                    If Not oOperatorPart Is Nothing Then
                        Set OpOrigin = New DPosition
```

```
                            OpOrigin.Set 0, 0, 0
                            oDirX.Set Cos(parHandwheelAngle), 0, Sin(parHandwheelAngle)
                            oDirY.Set 0, 1, 0
                            oDirZ.Set -Sin(parHandwheelAngle), 0, Cos(parHandwheelAngle)
                            Set oOperatorOcc = oSymbolHelper.CreateChildPartOcc("ValveOperator1", oOperatorPart, OpOrigin,
oDirX, oDirY, oDirZ)

                            Set oIJDEditJDArgument = GetIJDEditJDArgument(oOperatorOcc)

                            'Offset from Valve Center line
                            UpdateOperatorAttributes oOperatorOcc, "IJUAOffsetFrmValCen", _
                                                "OffsetFrmValCen", parMotorOffsetfrmValCen, oIJDEditJDArgument

                            Set oIJDInputsArg = oOperatorOcc
                            oIJDInputsArg.Update
                    End If
                Set oVlvPart = Nothing
            End If
        End If
    End If
```

Valve Operator Symbol

The following method is available to support valve operator symbols.

▪ **GetMountingLocationsAndValveAccessories** - Retrieves the mounting locations and valve accessory collection.

The following example shows the valve operator symbol:

```
' Insert your code for the Valve Accessory parts
        Dim oVlvOpPart As IJValveOperator
        Dim oAccessoryCol As IJDCollection
        Dim aMountingLocations() As Long

        Set oVlvOpPart = oPartFclt
        On Error Resume Next
        Call oVlvOpPart.GetMountingLocationsAndValveAccessories(aMountingLocations, oAccessoryCol)
        'Set oVlvOpPart = Nothing

        oSymbolHelper.OutputCollection = m_OutputColl

        On Error Resume Next
        Dim oOperatorOcc As IJPartOcc
        Dim oOpPart As IJValveOperator
        Dim i As Long
        Dim lLocation As Long
        If Not oVlvOpPart Is Nothing Then
        On Error Resume Next
            If Not oAccessoryCol Is Nothing Then

                For i = 1 To oAccessoryCol.Size
                    lLocation = aMountingLocations(i)

                    ' Insert your Code for Side Mounted Accessory
                    If lLocation = 1 Then
                        Set oOpPart = oAccessoryCol.Item(i)
                        OpOrigin.Set 0, parOffsetfromValveCenterLine + parActuatorHeight, 0
                        oDirX.Set 1, 0, 0
                        oDirY.Set 0, 1, 0
                        oDirZ.Set 0, 0, 1
                        Set oOperatorOcc = oSymbolHelper.CreateChildPartOcc("ValveAccessory1", oOpPart, OpOrigin,
oDirX, oDirY, oDirZ)

                        Set oIJDEditJDArgument = GetIJDEditJDArgument(oOperatorOcc)
                        Set oOpPart = Nothing
                        Set oOperatorOcc = Nothing
                    End If
                    If lLocation = 2 Then
                        Set oOpPart = oAccessoryCol.Item(i)
                        OpOrigin.Set 0, parOffsetfromValveCenterLine + parAccessory2YOffset, 0
                        oDirX.Set 0, 1, 0
                        oDirY.Set Cos(parAngle), 0, Sin(parAngle)
                        oDirZ.Set Sin(parAngle), 0, -Cos(parAngle)
                        Set oOperatorOcc = oSymbolHelper.CreateChildPartOcc("ValveAccessory2", oOpPart, OpOrigin,
oDirX, oDirY, oDirZ)

                        Set oIJDEditJDArgument = GetIJDEditJDArgument(oOperatorOcc)
                        Set oOpPart = Nothing
                        Set oOperatorOcc = Nothing
                    End If
                Next i
            End If
        End If
```

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Materials Classes (on page 367)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Standard Notes

The **Standard Notes** node defines standard notes. These notes are used for the **PipingNote1** columns in other nodes.

Name (Required)

Type a unique number to identify the note.

Purpose (Optional)

Type the code that defines the purpose of the note. Valid purposes are defined in the **Note Purpose** select list.

Text (Required)

Enter the note text.

Piping Commodity Material Control Data

The **Piping Commodity Material Control Data** node defines the material control data for the piping specification. This information does not vary per piping materials class.

Alt Orientation Commodity Code (Optional)

Specifies the contractor commodity code for the alternate orientation piping commodity. The software uses this alternate piping commodity when the original asymmetrical piping commodity is mirrored or mirror copied and the new orientation is not representative of the component. In this case the original piping commodity is replaced by the alternate orientation piping commodity specified here.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity.

Bolting Requirements (Optional)

Select the bolting requirement for the piping commodity. The following options are available:

- **Undefined** - The bolting requirement is undefined.

- **Bolting required** - The piping commodity requires a reportable set of bolts determined by the bolted joint, but based on a special bolt extension option. If you select this option, you must define the **Bolt Extension Option**.

- **Complete substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of threaded holes to match the drilling template applicable to the mating flange.

- **Complete substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of the bolted joint. Cap screws (or tap end stud bolts) are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of tapped holes to match the drilling template applicable to the mating flange.

- **Partial substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for threaded holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of threaded holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are threaded.

- **Partial substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of tapped holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are tapped.

- **Bolts supplied with nozzle and not to be reported** - The piping commodity is supplied with the necessary bolts included, such that the applicable bolts should not be reported.

- **Reportable bolts not required** - A set of bolts is not applicable to any end of this piping commodity because all ends are non-bolted. This option is the default for any piping commodity without any bolted ends.

- **Complete substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of threaded holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Complete substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of tapped holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Partial substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This option represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a partial set of threaded holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of the reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are threaded. This option is not available for nozzles.

- **Partial substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This will address the situation where the smaller end of a reducing flange includes a partial set of tapped holes with

respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of a reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are tapped. This option is not available for nozzles.

▪ **Complete cap screw substitution for full threaded and tapped holes for each bolted end** - Each bolted end requires a reportable set of substitution cap screws for full threaded holes and also tapped holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation. In other words, this represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the through-bolted fitting includes a complete set of threaded holes and also tapped holes to match the drilling template applicable to the companion flange. This can be required, as an example, for a larger size asymmetrical lug body butterfly valve where tapped holes are required near the valve stem. This option is not available for nozzles.

NOTES

▪ Any through-bolted joint, where the Termination Subclass for one of the bolted ends indicates through-bolted end with bolt holes, but the Bolting Requirement property for the fitting at that same bolted end indicates a complete substitution of cap screws (or tap end stud bolts), the software considers it to be a bolted joint, not a through-bolted joint.

▪ Although two or more through-bolted fittings may be involved in forming a through-bolted connection, the software assumes that only one through-bolted fitting exists for any situation where either complete substitution or partial substitution with cap screws (or tap end stud bolts) applies. Furthermore, whenever two or more through-bolted fittings form a through-bolted connection, the software assumes that the bolts extend through all of the through-bolted fittings.

Cap Screw Engagement Gap (Conditionally Required)

Specify the total gap between the cap screw ends inserted into each threaded hole end. The engagement gap is used in the bolt length calculations for cap screws in threaded holes. Use this field when an engagement gap that is unique to a component is needed, such as a lug body butterfly valve.

This engagement gap value is used for all cap screw diameters regardless of the cap screw diameter or the nominal piping diameter for the valve, or fitting, requiring the cap screws. If you do not specify a value here, then the default value for the piping specification is used.

Clamp Requirement (Conditionally Required)

Select whether or not the commodity requires a clamp if one or more mechanical ends apply. This option overrides the clamp query in the clamp selection filter when the value of the Termination Subclass is set to "Mechanical joint with clamp" or "Mechanical joint with clamp and hub or ferrule".

Client Commodity Code (Optional)

Specifies the client commodity code, which is the commodity code that is used during the operations and maintenance phase.

NOTE The **Contractor Commodity Code** and the **Client Commodity Code** both must be size-independent or size-dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule or neither must include a schedule.

CIMIS Commodity Code (Optional)

Specifies the Common Industry Material Identification Standards commodity code.

Contractor Commodity Code (Required)

Specifies the contractor commodity code, which is the commodity code that is used during the design phase.

📝 **NOTE** The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size-independent or size-dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule, or neither must include a schedule.

eClass eProcurement Code (Optional)

Specifies the eClass code (Standardized Material and Services Classification System), if available.

Fabrication Type (Conditionally Required)

Specifies the fabrication code.

First Size From (Conditionally Required)

Defines the lower bound of the largest nominal piping diameter for which this piping commodity applies.

First Size To (Conditionally Required)

Defines the upper bound of the largest nominal piping diameters for which this piping commodity applies.

First Size Units (Conditionally Required)

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could type **in** for inches or **mm** for millimeters.

Gasket Requirements (Conditionally Required)

Specifies the code that represents the piping commodity gasket requirements if one or more bolted end apply.

Hyperlink To Electronic Vendor (Optional)

Type the URL address to the electronic vendor catalog.

Hyperlink To Electronic Manuals (Optional)

Type the URL address to the electronic copy of the manuals.

Industry Commodity Code (Conditionally Required)

Specifies the industry commodity code, which is the commodity code that is used to access the piping catalog when the **Industry Commodity Code Option** in the **Model Options** is set to **Use industry commodity code**. Additionally you can map many industry commodity codes to a single contractor commodity code. This is useful in some situations like when you have the same valve body and different valve operators are available. The software can also use the contractor commodity code for querying the part data when the industry commodity code is not specified by the specification writer.

Legacy Commodity Code (Optional)

Type the commodity code required by a legacy material control system, if different from the

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contractor commodity code. For some legacy material control systems, the commodity codes are inadequate for Smart 3D. For example, the material control system uses the same commodity code for a globe valve from Manufacturer A and Manufacturer B, even when the face-to-face dimension of the two valves is different. You are required to use different commodity codes for these parts in Smart 3D. However, you may also have a requirement to track the globe valve based on its legacy commodity code. Use this column to solve the problem.

The legacy commodity code can be size-independent or size-dependent. However, the contractor commodity code and the legacy commodity code both must be size-independent, or both must be size-dependent commodity codes. Likewise, both the contractor commodity code and the legacy commodity code must include schedule, or neither must include schedule.

Localized Short Material Description (Optional)

Type a description for the material. The software uses this description in the bill-of- materials part of isometric drawings when construction personnel require a different language than what was used in the **Short Material Description** box.

Loose Material Requirements (Optional)

Specifies the code that represents the loose material requirements for the piping commodity.

Long Material Description (Optional)

Type a description for the material to use when requisitioning.

Manufacturer (Optional)

Specifies the code that represents the manufacturer of the piping commodity. This property is optional, but can be used to track the manufacturer for reporting when the **Geometric Industry Standard** is used to identify the industry standard instead of the manufacturer.

Manufacturer Part Number (Optional)

Specifies the manufacturer's part number for the object.

Multiport Valve Op Req (Optional)

Specifies the code that indicates whether multiport valve operators are required. If multiport valve operators are required, then the valve operator type and other valve operator data is determined from the multiport valve operator data for each port rather than the single valve operator type specified by the piping commodity material control data.

Multisize Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column is used.

⎙ **NOTE** You can append the keywords **Primary** (primary size) and **Secondary** (secondary size) to the column headings for the nominal piping diameters at each end in the workbook for the part data to assign the size to a specific piping point instead of using the **Multisize Option** property. Fittings that require two sizes will be assumed to have the primary size assigned to the first piping point and the secondary size assigned to the second

piping point. Multi-size fittings with three or more sizes must have the sizes assigned to the appropriate piping points by means of the multi-size option property. Fittings with exactly two sizes and three or more piping points may have the size assigned to the appropriate piping point by using these keywords.

Part Data Source (Conditionally Required)

Select the source of the part data. If you do not select a source, then the software assumes the data source to be the piping commodity class data. This property provides a means to recognize that a reportable piping commodity is not a generic piping commodity, but might be a bolt or gasket. For example, a clamp might imply a gasket as a reportable piping commodity. This property provides the means to specify data (the gasket type and the gasket material) in the gasket part data.

Piping Note 1 (Optional)

Specify the standard notes that you want to associate with the piping materials class. Standard notes are defined in the Piping > Piping Specification > Notes node.

Quantity of Alt Reportable Parts (Optional)

Specifies the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts (Optional)

Type the number of objects to be reported per instance of the piping commodity. This value must be an integer.

Reportable Commodity Code (Optional)

Type the commodity code of the piping commodity that you want created with the primary commodity code item. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here.

Reporting Type (Conditionally Required)

Type the reporting requirements code for the piping commodity. You can specify whether the commodity is reported. An example of a piping commodity that you may not want reported is a spacer for a valve. You have to order the valve, but the spacer comes with the valve and does not need to be ordered.

Second Size From (Conditionally Required)

Defines the lower bound of the next largest nominal piping diameter for which this piping commodity applies.

Second Size To (Conditionally Required)

Defines the upper bound of the next largest nominal piping diameters for which this piping commodity applies.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could type **in** for inches or **mm** for millimeters.

Short Material Description (Required)

Type a description for the material. The software uses this description in the bill-of-materials part of isometric drawings, for reporting, and for visual feedback to the piping designer for design, construction, and fabrication.

Subst Cap Screw Contractor Comdty Code (Conditionally Required)

Type the contractor commodity code for the replacement cap screws.

Subst Cap Screw Diameter (Conditionally Required)

Type the diameter of the cap screw including the units. For example, type **0.5in** or **1in**.

Subst Cap Screws Quantity (Conditionally Required)

Type the number of machine bolts or studs that are being replaced by cap screws at each bolted end of the piping commodity.

For non-through bolted fittings, the number of cap screws to substitute for machine bolts or studs required by the drilling template is the same as the number of machine bolts or studs being replaced.

For through bolted fittings with threaded holes, the number of cap screws required is twice the number of machine bolts or studs being replaced.

This value is not required when all bolts defined by the drilling template are replaced by cap screws.

Supply Responsibility (Optional)

Specifies the code that represents the person responsible for supplying the object.

Tapped Hole Depth (Conditionally Required)

Type the depth of the tapped hole in the valve or fitting that requires substitution cap screws, including the unit. This value is not required for substitution cap screws at threaded holes.

Tapped Hole Depth 2 (Conditionally Required)

Type the depth of the tapped hole at port two of an asymmetrical valve or fitting that requires substitution cap screws (or substitution tap end stud bolts), if applicable. For example, a lug body butterfly valve requires different length cap screws on the basis of the applicable end of the valve.

This value is used to compute the length of the cap screw. If a value has not been specified here, then the value of **Tapped Hole Depth** is used in the bolt length calculations. This value is not required for substitution cap screws at threaded holes or when the value of **Bolt Type** in the bolt part data indicates that the cap screw is actually a machine bolt.

UNSPSC eProcurement Code (Optional)

Specifies the UNSPSC® code (United Nations Standard Product and Services Classification), if available. For example, a UNSPSC code of 40141602 (40.14.16.02 or 40-14-16-02) identifies tube fittings. Note that the UNSPSC code alone will not uniquely identify the specific part to be procured.

Valve Operator Type (Conditionally Required)

Specifies the code that represents the specific type of valve operator, actuator, or appurtenance.

Valve Operator Geo Ind Std (Optional)

Specifies the code that represents the source used in the preparation of the catalog data applicable to the valve operator.

Valve Operator Catalog Part Number (Conditionally Required)

Type the commodity code for the valve operator as found in the catalog data and the material control data.

Vendor (Optional)

Specifies the code that represents the vendor that is supplying the piping commodity. This property is optional, but can be used to track the vendor for reporting.

Vendor Part Number (Optional)

Specifies the vendor's part number for the object.

Welding Requirements (Conditionally Required)

Specifies the code that represents the welding requirements for the piping commodity if one or more welded ends apply.

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Materials Classes (on page 367)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Piping Commodity Procurement

The **Piping Commodity Procurement** node defines the data used to determine the size-dependent Industry Commodity Code when the **Piping Commodity Catalog Part Number Basis Option** in the **Model Options** is set to "Use the size-dependent client commodity code from the piping commodity procurement data". Otherwise, this data is only be used when the **Piping Commodity Procurement Data Option** in the **Model Options** is set to something other than the default of "Not applicable". Otherwise, you must indicate whether the Contractor Commodity Code from the Piping Commodity Filter or the Industry Commodity Code from the Piping Commodity Material Control Data is used to query the data here. This information does not vary per piping materials class.

You, the piping specification writer, are required to define information if any of the following situations apply:

- To determine the Size-Dependent Industry Commodity Code, when a size-independent Contractor Commodity Code is being used in the Piping Commodity Filter.

- To determine the Size-Dependent Client Commodity Code on the basis of the Industry Commodity Code from the Piping Commodity Material Control data, which is independent of size and schedule by definition.

- To determine the Size-Dependent Client Commodity Code on the basis of the Contractor Commodity Code from the Piping Commodity Filter, when the Contractor Commodity Code is size-independent.

- To determine the size-dependent CIMIS Commodity Code on the basis of the Industry Commodity Code from the Piping Commodity Material Control data, which is independent of size and schedule by definition.

- To determine the size-dependent CIMIS Commodity Code on the basis of the Contractor Commodity Code from the Piping Commodity Filter, when the Contractor Commodity Code is size-independent.

- To determine the cost data on the basis of the Industry Commodity Code from the Piping Commodity Material Control data, which is independent of size and schedule by definition.

- To determine the cost data on the basis of the Contractor Commodity Code from the Piping Commodity Filter, when the Contractor Commodity Code is size-independent.

- To determine the schedule-dependent Client Commodity Code, when the Contractor Commodity Code from the Piping Commodity Filter is schedule-independent, and the size-dependent CIMIS Commodity Code is not required.

You can also choose to use the Size-Dependent Industry Commodity Code from the Piping Commodity Procurement data as the basis for querying for parts. The use of a Size-Dependent Industry Commodity Code is a special case that is intended to be used when you use a size-independent Contractor Commodity Code in the Piping Commodity Filter for easier maintenance, but require a size-dependent commodity code for purposes of material control. In such a situation, the Size-Dependent Industry Commodity Code represents the commodity code to be used with the material control system (and for querying the piping catalog for parts).

CIMIS Commodity Code (Optional)

Specifies the Common Industry Material Identification Standards commodity code.

Client Commodity Code (Conditionally Required)

Specifies the client commodity code, which is the commodity code that is used during the operations and maintenance phase.

NOTE Both, the **Commodity Code** and the **Client Commodity Code** must be size-independent or size- dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule or neither must include a schedule.

Commodity Code (Required)

Specifies the commodity code. This commodity code is either the *Contractor Commodity Code* from the **Piping Commodity Filter,** the *Industry Commodity Code* from the **Piping Commodity Material Control Data** (depending on how you are using this procurement data) or the Smart 3D Reference Data Identification number, which can be used as a size-dependent commodity code.

First Size (Conditionally Required)

Specifies the first size of the piping commodity.

You must enter a **First Size** value when the procurement data is based on the *Contractor Commodity Code* because it is assumed that the Contractor Commodity Code in the Piping Commodity Filter is size-independent.

You do not need to enter a **First Size** value when the schedule-dependent *Client Commodity Code* is determined from a schedule- independent *Contractor Commodity Code*, but the size-dependent CIMIS Commodity Code is not required.

You must also enter a **First Size** value when the procurement data is based on the *Industry Commodity Code* since the Industry Commodity Code is always independent of size and schedule.

First Size Schedule Practice (Conditionally Required)

Select the schedule practice. This option is only required if the **First Size Schedule** is

required.

First Size Schedule (Conditionally Required)

Select the thickness (schedule) for the piping commodity at the first size end.

You must select a schedule when the procurement data is based on the *Contractor Commodity Code* because it is assumed that the Contractor Commodity Code in the Piping Commodity Filter is size-independent.

You do not need to select a schedule when the *Contractor Commodity Code* is being used to query the procurement data and the Contractor Commodity Code reflects schedule.

You must also select a schedule when the procurement data is based on the *Industry Commodity Code* since the Industry Commodity Code is always independent of size and schedule.

First Size Units (Conditionally Required)

Specifies the units for the **First Size** column. For example, you could type **in** for inches or **mm** for millimeters.

Installation Man Hours (Optional)

Specifies the man-hours required to install the piping commodity. This value is used only for reporting purposes.

Maintenance Man Hours (Optional)

Specifies the man-hour required to maintain the piping commodity. This value is used only for reporting purposes.

Manufacturer Part Number (Optional)

Specifies the manufacturer's part number for the object.

Multisize Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column is used.

Requisition Number (Optional)

Specifies the requisition, or purchase order, number. This value is used only for reporting purposes.

Second Size (Conditionally Required)

Specifies the second size of the piping commodity.

You must enter a **Second Size** value when the procurement data is based on the *Contractor Commodity Code* because it is assumed that the Contractor Commodity Code in the Piping Commodity Filter is size-independent.

You do not need to enter a **Second Size** value when the schedule-dependent *Client Commodity Code* is determined from a schedule- independent *Contractor Commodity Code*, but the size-dependent CIMIS Commodity Code is not required.

You must also enter a **Second Size** value when the procurement data is based on the *Industry Commodity Code* since the Industry Commodity Code is always independent of size and schedule.

Second Size Schedule (Conditionally Required)

Select the thickness (schedule) for the piping commodity at the second size end.

You must select a schedule when the procurement data is based on the *Contractor Commodity Code* because it is assumed that the Contractor Commodity Code in the Piping Commodity Filter is size-independent.

You do not need to select a schedule when the *Contractor Commodity Code* is being used to query the procurement data and the Contractor Commodity Code reflects schedule.

You must also select a schedule when the procurement data is based on the *Industry Commodity Code* since the Industry Commodity Code is always independent of size and schedule.

Second Size Schedule Practice (Conditionally Required)

Select the schedule practice. This option is only required if the **Second Size Schedule** is required.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size** column. For example, you could type **in** for inches or **mm** for millimeters.

Unit Cost (Optional)

Specifies the unit cost for the piping commodity. This value is used only for reporting purposes.

Vendor Part Number (Optional)

Specifies the vendor's part number for the object.

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Materials Classes (on page 367)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Piping Materials Classes

The **Piping Materials Classes Data** rule defines the piping material classes that you want to use in your piping specifications. Piping material class data is independent of nominal piping diameter and commodity items. A piping materials class defines a classification of components based on design data and service limits.

Approval Date (Optional)

Type the time or date the status of the piping materials class was approved.

Approved By (Optional)

Type the name of the person or group who approved the status of the piping materials class.

Automated Flange Selection Option (Optional)

Select enabled to activate the automated flange selection logic to distinguish between flanges inserted on plain piping versus fitting-to-fitting situations. Typically, you would enable this option for piping material classes that include slip-on flanges or lap-joint flanges. For more information, see *Automated Flange Selection* (on page 370).

If disabled, the generic short code for the flange that is subject to automated flange selection is used for this piping material class.

If enabled, the software selects the generic short code for the flange for plain piping or selects the flange for a fitting based on where the flange is inserted.

Comments (Optional)

Type a brief comment describing the justification for the piping materials class status.

Design Standard (Optional)

Specify the design standard that you want to use in this piping materials class to calculate the piping wall thickness and the branch reinforcements.

Examination (Optional)

Defines the standard to use for examinations, inspections, and testing.

Fluid Service (Optional)

Type the intended fluid service for this piping materials class. You may want to include the physical state of the fluid. Examples are, **Potable Water**, **High Pressure Steam**, **Underground Water**, or **Chilled Water**. In the case of a jacketed piping specification, this property represents the fluid service for the core.

Gasket Requirement Override (Optional)

Specify the gasket override code for the piping material class.

Hyperlink To Human Spec (Optional)

Specify the location of the electronic version of the piping materials class. You can specify the location using the http:// protocol or by using a Universal Resource Location (URL) address (for example, \\server\share).

Jacket and Jumper Fluid Service (Optional)

Type the intended fluid service for jackets and jumpers in this piping materials class. You may want to include the physical state of the fluid. Examples are, **Potable Water**, **High Pressure Steam**, or **Chilled Water**.

Jacket Material Of Construction Class (Optional)

Select the material of construction class for the jacket.

Jacket Materials Description (Optional)

Type a generic description of the material used for jackets in this piping materials class. An example is, **CL150, Carbon Steel, RFFE, Trim 8, < 2" SWE, >= 2" BE**. Do not include the intended fluid service or applicable corrosion allowance.

Jumper Material of Construction Class (Optional)

Select the material of construction class for the jumper.

Last Modified On (Optional)

Type the time or date the status of the piping materials class was set.

Lining Material (Optional)

Select the type of lining material (for example, cement-mortar, concrete, epoxy, rubber, or plastic lining) required for the field lining of plain piping within this piping materials class. If you do not specify a value, the software assigns a default value of "Undefined".

Lining Requirements (Optional)

Specify whether or not field lining is required in this piping material class. If you set this to "Lined", you need to define information in the *Field Lining Thickness* (on page 399) rule.

Materials Description (Optional)

Type a generic description of the material used for this piping materials class. An example is, **CL150, Carbon Steel, RFFE, Trim 8, < 2" SWE, >= 2" BE**. Do not include the intended fluid service or applicable corrosion allowance. This property is used in reporting.

Materials Group (Optional)

Defines the material group for the materials class.

Materials Type (Optional)

Defines the material type for the materials class.

Materials of Constructions Class (Optional)

Select the material of construction class. This option is used for grouping similar piping material classes for the benefit of the specification writer in managing piping specifications.

Piping Commodity Override Option (Optional)

Specify whether you want to disable, enable with no justification required, or enable with justification required the ability of a piping designer to override the piping materials class to select a piping commodity manually.

🗎 NOTE This setting overrides the piping commodity override option setting on the **Model Options** node for this piping material class.

Piping Note 1 (Optional)

Specify the standard notes that you want to associate with the piping materials class. Standard notes are defined in the Piping > Piping Specification > Notes node.

Piping Spec Status (Optional)

Defines the status of the piping materials class.

Responsibility (Optional)

Type the name of the person or group responsible for specifying the status of the piping materials class.

Revision Number (Optional)

Type the revision number of the piping materials class. If you have enabled the **Piping Spec Version Management Option** in the **Model Options** node, the text that you type here is appended to the end of the piping specification name. For example, if the piping specification is originally named 1C0100, the piping specification with the revision is named "1C0100, Rev: <text>". You must change this revision number manually each time you make a change to a piping specification.

Spec Name (Required)

Type a name for the piping material class that you are defining. The software display*s this* name on the interface. All names must be unique.

Stress Relief (Optional)

Defines the stress relief standard to use for the piping materials class. Stress-relieving heat treatment reduces residual stresses resulting from bending and welding.

Stress Relief Requirement (Optional)

Defines the stress relief requirement for the material class. If you do not define a value, the software assigns **1** (Undefined) by default.

Washer Creation Option (Optional)

Specifies whether or not the software should create washers at a bolted joint.

Welding Procedure Practice (Optional)

Select the industry practice on which the **Welding Procedure Specification** (WPS) is based.

Welding Procedure Specification (Optional)

Select the Welding Procedure Specification (WPS) to be used for the piping materials class. A welding procedure specification represents the standard for shop and field welding requirements. Section IX of the ASME Boiler and Pressure Vessel Code specifies the requirements for the qualification of the welding procedure specifications employed when welding in accordance with the ASME Boiler and Pressure Vessel Code and the ASME B31 Code for Pressure Piping. The default specification is "Undefined".

See Also

Automated Flange Selection

To enable or disable the automated flange selection, set the **Automated Flange Selection Option** as appropriate in the piping material class. For more information, see *Piping Materials Classes* (on page 367).

The software bases automated flange selection on the end's Termination Class property being set to "Bolted" (select list value 5).

Automated flange selection uses the piping commodity class data to select the flange that identically matches the Pressure Rating, End Preparation, and End Standard of the bolted end to which the flange is to be connected. However, the bolted end generic data is used to determine the best match if the Pressure Rating, the End Preparation, or the End Standard is different between the bolted end of the flange and the bolted end in the model.

The Bolt Circle Diameter, Quantity of Bolts Required, and Bolt Diameter are also used to automatically select the appropriate flange. This is the same data required to create bolts in the model.

- Bolt Circle Diameter is required for comparison of circular bolt hole patterns

- Bolt Pattern Length is required for comparison square bolt hole patterns

- Bolt Pattern Length and Bolt Pattern Width are required for comparison of rectangular bolt hole patterns

- Bolt Pattern Length is required for both triangular and oval bolt hole patterns

A bolted end of one bolt hole pattern is only compatible with a bolted end of the same bolt hole pattern. In other words, a circular bolt hole pattern is never considered compatible with a square or rectangular bolt hole pattern.

The flange selection process also handles small and large tongue-and-groove flanges and small and large male-and-female flanges, where male and female ends are involved. The software selects the flange based on a compatible end preparation versus an identical end preparation. Other types of flanges include ring type joint and lap joint.

The software automatically selects the correct flange for non-thru-bolted ends and for thru-bolted ends with bolt holes using the following criteria (End Preparation, Pressure Rating, and End Standard) priority with the highest priority listed first and the remaining conditions listed in descending order:

- An identical match of End Preparation, Pressure Rating, and End Standard.

- An identical match of Pressure Rating and End Standard and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility.

An identical match of End Preparation and an acceptable combination of Pressure Rating and End Standard determined by an identical drilling template as defined by the bolted end generic data (the Flange Outside Diameter, the Quantity of Bolts Required, the Bolt Circle Diameter, and the Bolt Diameter).

- The latter condition occurs when either the Pressure Rating or the End Standard differ. In other words, unless both Pressure Rating and End Standard are identical, the drilling template must be compared.

- In some situations for ASME, a CL125 flange has a drilling template that is identical to a CL150 flange. Likewise, in the DIN standard, PN10 and PN16 flanges have identical drilling

templates up to a nominal piping diameter of 150 mm. As an example, a valve with a pressure rating of PN16 might be connected to a nozzle with a pressure rating of PN10.

- An acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility. An acceptable combination of Pressure Rating and End Standard determined by an identical drilling template as defined by the bolted end generic data (Flange Outside Diameter, Quantity of Bolts Required, Bolt Circle Diameter, and Bolt Diameter). In other words, unless both Pressure Rating and End Standard are identical, the drilling template must be compared.

The software automatically selects the correct flange at a thru-bolted end without bolt holes, when a bolted fitting exists at the "other" end of the thru-bolted fitting using the following criteria. In this situation, the candidate flange is compared to the bolted fitting at the "other" end of the thru-bolted fitting, if the "other" bolted fitting exists.

- An identical match of End Preparation, Pressure Rating, and End Standard.

- An identical match of Pressure Rating and End Standard and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility.

If an acceptable flange is not available with a Pressure Rating and End Standard that are both identical to that of the thru-bolted end, the selection of the flange is based on the first non-thru-bolted end at the "other" end of the thru-bolted fittings. In other words, although the End Preparation from the "other" non-thru bolted end is used in the drilling template comparison, the End Preparation from the thru-bolted end without bolt holes is used in the verification of the acceptability of the End Preparation. In this situation, the Pressure Rating of the thru-bolted end without bolt holes is ignored in the drilling template comparison.

- The data (Pressure Rating, End Preparation, End Standard, and Nominal Piping Diameter) for the comparison of the drilling templates is determined by the non-thru-bolted end at the "other" end of the thru-bolted arrangement, if such an end exists. This is necessary because by definition, this thru-bolted End Preparation does not require bolts, whereas the bolted end generic data is required for the drilling template comparison. The remaining data for the thru-bolted end is determined from the thru-bolted component itself. An example of this thru-bolted end without bolt holes scenario, if an orifice flange is being selected at one end of an orifice plate for which an orifice flange exists at the other end of the orifice plate, the drilling templates is compared by the bolted end generic data for the two orifice flanges.

The software automatically selects the correct flange at a thru-bolted end without bolt holes, when a bolted fitting does not exist at the "other" end of the thru-bolted fitting using the following criteria. In this situation, the candidate flange is compared to the thru-bolted fitting.

- An identical match of End Preparation, Pressure Rating, and End Standard.

- An identical match of Pressure Rating and End Standard and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility.

An identical match of Pressure Rating and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility.

- Because an identical match of End Standard is not required, the resulting flange may not be compatible. However, only the piping designer (or piping specification writer) can determine the compatibility in this case. An example of this thru-bolted end without bolt holes scenario, if an orifice flange is being selected at one end of an orifice plate, when an orifice flange does not exist at the other end of the orifice plate, the Pressure Rating of the orifice flange is compared for equality with the Pressure Rating of the orifice plate.

Automated flange selection never selects a slip-on flange or a lap-joint flange without stub ends for connection to any type of fitting. The non-bolted end of slip-on, or lap joint, flanges should only be connected to a plain section of pipe. For a piping materials class where slip- on, or lap joint, flanges are applicable, two groups of flanges are available:

- Flanges to use when connecting to pipe stock.

- Flanges to use in a fitting-to-fitting situation.

Such piping materials classes should have the automated flange selection option enabled to automatically select the flange based upon the configuration in the model (being connected to pipe stock or is used in a fitting-to-fitting situation).

However, there are often allowable exceptions to this rule. When space is tight, it is often permitted to attach slip-on flanges to butt weld reducers and long radius 90° elbows and 45° elbows. Even in tight spaces, however, it is usually unacceptable to attach slip-on flanges to butt weld short radius 90° elbows, tees, and crosses because the back of the slip-on flange hits the curvature of these fittings. For these situations, the piping designer must select the appropriate flange. The piping specification writer can specify which flanges are subject to the automated flange selection logic using the Selection Basis property in the piping commodity filter.

The automated flange selection logic also applies to placing a flange at a nozzle. Changing the nozzle's end conditions, for example the End Preparation or the Pressure Rating, results in a different flange being selected from the Piping Specification.

In some situations, the engineering contractor may purchase a pump with bolted nozzles based on an ASME flange standard. In such a case, the supplier is typically requested to provide with the pump a set of compatible flanges to be welded to DIN piping. In other words, the vendor may be required to provide a special flange with a DIN female port and an ASME bolted port. It is possible that the nozzle's drilling template may be compatible with the default DIN flange for the applicable piping materials class. Because the flange selection is based on matching the drilling templates of the nozzle face and the flange face, the piping designer would be required to select an optional flange with a DIN female port, because at the time the flange is being selected for the ASME nozzle, the knowledge that DIN piping will be connected to the female end of the flange is not available to the software.

On the other hand, if the piping materials class does not include a DIN flange with a drilling template identical to that of the ASME nozzle, then the special ASME/DIN flange would be selected automatically.

In the case of flanges, the active size may not be defined by the piping designer, while routing in the 3D model, in the same system of units for Nominal Piping Diameter as the Nominal Piping Diameter system of units used by the spec writer to define the flanges in the piping commodity filter. For that reason, a flange is selected from the piping commodity filter by the Nominal Piping Diameter value in the primary units, which is represented by the active size defined by the piping designer in the 3D model; or the flange is selected from the piping commodity filter by the Nominal Piping Diameter in the secondary units, as defined by the Nominal Piping Diameter Equivalence rule, if the flange has not been defined by the primary system of units. Consequently, it is not necessary for the spec writer to define the flange in both Nominal Piping

Diameter systems of units. Nor is it necessary for the piping designer to define the active size in the system of units used by the spec writer.

Special Considerations for Orifice Plates and Orifice Flanges

A unique flange selection requirement exists at the thru-bolted orifice plate end. If the bolted fitting at the "other" thru-bolted fitting end is an orifice flange, then the automated flange selection is based on the available orifice flanges and not on the Default Short Code for a flange. The orifice flange existence as the bolted fitting at the "other" thru-bolted fitting end is determined by the Piping Component Subclass property being set to "Orifice Flanges". The Short Code to use in querying the piping commodity filter for an orifice flange is determined by the Default Piping Commodity Selection rule.

A similar requirement exists when the piping designer is inserting an orifice plate in a pre-existing pipe run. Typically, the mating flanges for the thru-bolted orifice plate would be selected based on the Default Short Code for a flange. However, in the case of an orifice plate, the Short Code for an orifice flange is used in the automated selection of flanges. The existence of the orifice plate is determined by the Piping Component Subclass property being set to "Orifice Plates"; or by the instrument being thru-bolted and the value of the Instrument Functional Subclass property being set to "Flow rate primary elements".

However, when the piping designer inserts an orifice flange in a pre-existing pipe run, a mating flange should not be selected automatically, because an orifice plate will always exist between two automatically inserted orifice flanges.

A restricting orifice plate is similar to an orifice plate. However, the distinction is that the orifice plate is used where the measurement of flow is required and can only be achieved by using adjacent orifice flanges with tapped holes to read the upstream and downstream differential pressure. The restricting orifice plate is inserted between normal untapped flanges and is used to restrict the flow and maintain a constant back pressure on the upstream side of the plate. This type of restricting orifice plate will have an instrument functional classification set to "Flow quantity primary elements". The spec writer must not include the restricting orifice plate under the same parent that is the value of Piping Component Subclass, as the orifice plate such that the correct flanges are selected.

Verifying the Drilling Template Consistency of Two Bolted Ends

The software verifies the drilling template consistency of two bolted ends when the ends' Termination Class property is set to "Bolted" (select list value 5).

The criteria priorities (End Preparation, Pressure Rating, and End Standard) for verifying the drilling template consistency for non-thru- bolted ends and for thru-bolted ends with bolt holes are (the highest priority is first and are listed in descending order of priority):

- An identical match of End Preparation, Pressure Rating, and End Standard.

- An identical match of Pressure Rating and End Standard and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule where the Materials Category of each applicable fitting is considered in determining compatibility.

- An identical match of End Preparation and an acceptable combination of Pressure Rating and End Standard determined by an identical drilling template, as defined by the bolted end generic data (Flange Outside Diameter, Quantity of Bolts Required, Bolt Circle Diameter, and Bolt Diameter).

- An acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility. And, an acceptable combination of Pressure Rating and End Standard determined by an identical drilling template as defined by the bolted end generic data (Flange Outside Diameter, Quantity of Bolts Required, Bolt Circle Diameter, and Bolt Diameter). Unless both Pressure Rating and End Standard are identical, the drilling template must be compared.

The criteria used for determining the compatibility between a flange at a thru-bolted end without bolt holes, when a bolted fitting exists at the "other" end of the thru-bolted fitting. In this situation, the candidate flange is compared to the bolted fitting at the "other" end of the thru- bolted fitting, if the "other" bolted fitting exists.

- An identical match of End Preparation, Pressure Rating, and End Standard.

- An identical match of Pressure Rating and End Standard and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule where the Materials Category of each applicable fitting is considered in determining compatibility.

If either the Pressure Rating or End Standard of the candidate flange differs from that of the thru-bolted end without bolt holes, the determination of the compatibility of the candidate flange is based on the first non-thru-bolted end at the "other" end of the thru-bolted fittings. In other words, although the End Preparation from the "other" non-thru bolted end is used in the drilling template comparison, the End Preparation from the thru-bolted end without bolt holes is used in the verification of the acceptability of the End Preparation.

- In this situation, the Pressure Rating of the thru-bolted end without bolt holes is ignored in the drilling template comparison. The data to be used for the comparison of the drilling templates (Pressure Rating, End Preparation, End Standard, and Nominal Piping Diameter) is determined by the non-thru-bolted end at the "other" end of the thru-bolted arrangement, if such an end exists. This is necessary because this thru-bolted End Preparation does not require bolts, whereas the bolted end generic data is required for the drilling template comparison. The remaining data to be compared for the thru-bolted end is determined from the thru-bolted fitting itself.

The criteria used for determining the compatibility between a flange at a thru-bolted end without bolt holes, when a bolted fitting does not exist at the "other" end of the thru-bolted fitting. In this situation, the candidate flange is compared to the thru-bolted fitting.

- An acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule where the Materials Category of each applicable fitting is considered in determining compatibility. In this situation, the Pressure Rating of the thru-bolted fitting without bolt hole is ignored in the drilling template comparison. Because an identical match of End Standard is not required, the resulting flange may not be compatible. However, only the piping designer (or piping specification writer) can determine the compatibility in this case.

Optional Flanges

The piping designer can select from a list of available flanges the appropriate flange in the following conditions:

- A list of flange options is displayed, if the flange being selected by the piping designer is to be connected to a thru-bolted end without bolt holes, if another non-thru-bolted end does not exist at the "other" end of the thru-bolted arrangement.

- A list of flange options is displayed, if the flange is not being inserted by the bolted end or the flange is not being connected to previously inserted piping. The software assumes that the piping designer is selecting an optional flange by criteria other than the drilling template in this situation.

The automated flange selection logic does not apply to these conditions.

These optional flanges should use the same short code as the Functional Short Code (Generic Short Code) for the default flange for that piping materials class, and the Selection Basis property should be set to "Flange selection logic is disabled". The optional flanges, where the Selection Basis property is set to "flange selection logic is enabled" will also be available to the piping designer because it is possible that there might be a situation that requires one of the flanges, which has been rejected by the automated flange selection logic, to be selected manually by the piping designer.

Automated Hub or Ferrule Selection

The software automatically inserts a hub or ferrule with a clamp when the Termination Subclass property is set to "Mechanical Joint with Clamp and Hub or Ferrule".

Automated hub or ferrule selection must use the piping commodity class data to select the hub or ferrule that matches the End Preparation and the End Standard of the mechanical end to which the hub or ferrule is to be connected. The correct hub or ferrule is selected by an identical match of End Standard, and an acceptable End Preparation determined by the End Preparation Compatibility rule, and, optionally, the End Preparation Compatibility Exceptions rule, where the Materials Category of each applicable fitting is considered in determining compatibility.

For example, a male Techlok end is specified to be compatible with a female Techlok end, or a male Grayloc® end is specified to be compatible with a female Grayloc® end, but a male Techlok end is not compatible with a female Grayloc® end, if both are available in the same size range of the same piping materials class for whatever reason.

A hub or ferrule is selected from the piping commodity filter by the value for the Nominal Piping Diameter in the "primary" system of units, which is represented by the active size defined by the piping designer in the 3D model, or the hub or ferrule is selected from the piping commodity filter by the Nominal Piping Diameter in the "secondary" system of units, as defined by the Nominal Piping Diameter Equivalence rule if the hub or ferrule has not been defined by the "primary" system of units. It is not necessary to define the hub or ferrule in both Nominal Piping Diameter systems of units. Nor is it necessary for the piping designer to define the active size in the system of units used by the spec writer.

Bolt Selection Filter

The **Bolt Selection Filter** node defines selection rules for the studs, machine bolts, and cap screws used for bolted joints in the model. Selected bolts should conform to the design specifications defined in the flange design. You must ensure that the correct material grade is selected to match the recommended bolting temperature and stress ranges.

Typically, a piping materials class requires only one bolt; therefore, it is not necessary to specify the bolt in the bolt selection filter on the basis of the end preparation, end standard, and pressure rating for either bolted end. It is necessary to specify the bolt on the basis of the size range. You can choose to include two or more bolts based on a maximum temperature. A maximum temperature is required for bolts for which the bolt material is not suitable for the full temperature range of the piping materials class.

If the piping materials class includes the possibility of a bolted joint with different pressure ratings on each side, but identical drilling templates, you must also base each bolt within the bolt selection filter on the end preparation, end standard, and pressure rating for both bolted ends.

If the piping materials class includes a bolted fitting, such as a wafer butterfly valve, that requires a complete substitution with cap screws, the commodity code for the cap screw is determined on the basis of the specific fitting from the piping commodity material control data. It is not necessary to specify the cap screw in the bolt selection filter.

If the piping materials class includes thru-bolted fittings, the bolt selection filter must include the applicable combinations of non-thru-bolted ends and the thru-bolted ends as the means to determine the type of bolt.

Alternate End Preparation (Optional)

Type the end preparation code for the other end when a second end preparation applies to the bolted joint, for example, small-grove-face lap-flanged end.

Alternate End Standard (Optional)

Type the other end standard code when a second end standard applies to the bolted joint.

Alternate Pressure Rating (Optional)

Type the other pressure rating code when a second pressure rating applies to the bolted joint.

Bolt Extension Option (Optional)

Enter the bolt extension option code. The code is used in determining the length of the exposed threads for the bolt length calculation for both studs and machine bolts from the **Generic Bolt Data**. The bolt extension also includes any additional length required for stud tensioners.

Bolt Option (Conditionally Required)

Type the bolt option code to use when the piping designer does not select a bolt type.

Comments (Optional)

Specify an optional brief description of the commodity.

Contractor Commodity Code (Required)

Type the contractor commodity code, which identifies the bolt that you want to use from the *Bolt Part Data Sheet* (on page 307).

End Preparation (Optional)

Type the end preparation code for the bolted joint.

End Standard (Optional)

Type the end standard code for the bolted joint.

Fabrication Category Override (Optional)

Type the fabrication code.

Lubrication Requirements

Select the lubrication requirements code for the bolt.

Maximum Temperature (Optional)

Specify the maximum temperature the bolt is intended for in this piping material class. You must specify the maximum temperature if the bolt is not intended for the full temperature range of the corresponding piping material class.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this bolt applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this bolt applies.

NPD Unit Type (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Piping Note 1 (Optional)

Specify the Standard Notes that you want to associate with the filter. Standard notes are defined in the Piping > Piping Specification > Notes node.

Pressure Rating (Optional)

Type the pressure rating code for the bolted joint. This property defines the envelope of pressure to which the bolted joint may be subjected.

Priority (Optional)

Type the priority value that this bolt should have when the software selects bolts for a bolted joint at a piping specification break, and the bolt requirements are different between the two piping materials classes. The lower the number, the higher the priority is for the bolt.

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

See Also
Bolt Length Calculations (on page 308)
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)
Bolt Selection Filter for Nozzles (on page 462)
Machine Bolt Length Calculation Tolerance (on page 403)
Preferred Machine Bolt Length (on page 414)
Preferred Stud Bolt Length (on page 415)
Stud Bolt Length Calculation Tolerance (on page 421)
Piping Materials Class Rules (on page 174)

Clamp Selection Filter

The **Clamp Selection Filter** node defines selection rules for clamps used for mechanical joints in the model.

The **Termination Subclass** property of the **End Preparation** is used to determine whether or not the clamp selection filter is used to select a clamp. Clamps are required when the **Termination Subclass** property is "Mechanical Joint with Clamp" or "Mechanical Joint with Clamp and Hub or Ferrule".

Clamps and Gaskets

Some clamps also require either a seal ring or a gasket between the mechanical ends. If the seal ring or the gasket is to be reported independently of the clamp, the clamp part must indicate that in the **Gasket Requirement** option in the **Piping Commodity Material Control Data** to select the gasket from the gasket selection filter.

The **Gasket Requirement** option also indicates whether the gasket is to be selected on the basis of the hub's schedule, as in the cases of Grayloc®, SPO-Lock, and Techlok types of clamps, or the gasket thickness is not a function of the combination of the hub and gasket, as in the case of the Tri-Clamp type of clamp.

The seal ring or the gasket is inserted automatically for any clamp at a mechanical joint, where the **Gasket Requirement** option in the **Piping Commodity Material Control Data** for the clamp indicates that a gasket is required. The maximum temperature, pressure rating, and fluid code are not required when selecting a gasket for a mechanical joint from the gasket selection filter. Conversely, the schedule is only required when selecting a gasket for a mechanical joint, which involves hub ends. However, the schedule is not required for selecting a gasket at a mechanical joint based on ferrule ends.

Clamps and the Automatic Insertion of Hubs

If you insert a mechanical hub; such as Techlok, Grayloc®, or SPO-Lock; or insert a fitting with Techlok-type, Grayloc®-type, or SPO-Lock- type hub ends and continue routing pipe stock, then a second matching hub is automatically inserted when the **End Preparation's Termination Subclass** property is "Mechanical Joint with Clamp and Hub or Ferrule".

However, before the second hub is inserted automatically, a clamp must be selected based on the two mechanical ends. In the case of Techlok, Grayloc®, and SPO-Lock fittings, the clamp indicates (by means of the **Gasket Requirement** option of the **Piping Commodity Material Control Data**) that a seal ring (gasket) is required. The seal ring is determined based on the properties of the hub. The second hub is then inserted and spaced by the applicable gasket gap. Therefore, when you insert a single mechanical hub, or a fitting with hub ends, a second mechanical hub, a clamp, and a seal ring are inserted automatically.

Clamps and the Automatic Insertion of a Ferrule

If you insert a mechanical ferrule, such as a Tri-Clamp, or insert a fitting with male ferrule ends and continue routing pipe stock, then a second matching ferrule is automatically inserted when the **End Preparation's Termination Subclass** property is "Mechanical Joint with Clamp and Hub or Ferrule".

However, before the second ferrule is inserted automatically, a clamp must be selected based on the two mechanical ends. In the case of Tri-Clamp fittings, the clamp indicates (by means of the **Gasket Requirement** option of the **Piping Commodity Material Control Data**) that a rubber-like gasket is required. Unlike the seal ring for Grayloc®, SPO-Lock, and Techlok fittings,

the gasket is not based on the properties of the ferrule. The second ferrule is then inserted and spaced by the applicable gasket gap. Therefore, when you insert a single mechanical ferrule, or a fitting with male ferrule ends, a second mechanical ferrule, a clamp, and a gasket are inserted automatically.

Alternate End Preparation (Conditionally Required)

Type the end preparation code for the other end when a second end preparation applies to the mechanical joint. For example, small-grove-face lap-flanged end.

Alternate End Standard (Conditionally Required)

Type the other end standard code when a second end standard applies to the mechanical joint.

Alternate Pressure Rating (Conditionally Required)

Type the other pressure rating code when a second pressure rating applies to the mechanical joint.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity.

Clamp Option (Conditionally Required)

Type the clamp option code to use when the piping designer does not select a clamp type.

Clamp Selection Basis (Conditionally Required)

Enter the clamp selection basis code. If you set this option to "Clamp requires clamp-specific service Limits validation" or   "Clamp and implied gasket require clamp-specific service limits validation", then the software uses the commodity specific service limits that are define in *Piping Commodity Service Limits* (on page 340).

Comments (Optional)

Specify an optional brief description of the commodity code.

Contractor Commodity Code (Required)

Type the contractor commodity code, which is the code that identifies the clamp that you want to use.

End Preparation (Required)

Type the end preparation code for the mechanical joint.

End Standard (Optional)

Type the end standard code for the mechanical joint.

Fabrication Category Override (Optional)

Type the fabrication code.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this clamp applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this clamp applies.

NPD Unit Type (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Piping Note 1 (Optional)

Specify the Standard Notes that you want to associate with the filter. Standard notes are defined in the Piping > Piping Specification > Notes node.

Pressure Rating (Conditionally Required)

Type the pressure rating code for the mechanical joint. This property defines the envelope of pressure to which the mechanical joint may be subjected.

Priority (Optional)

Type the priority value that this clamp should have when selecting clamps for a mechanical joint at a piping specification break and the clamp requirements are different between the two piping materials classes. The lower the number, the higher the priority is for the clamp.

Quantity of Alt Reportable Parts (Optional)

Enter the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts (Optional)

Type the number of objects to be reported per instance of the piping commodity. This value must be an integer.

Reportable Commodity Code (Optional)

Type the commodity code of the piping commodity that you want created with the primary commodity code item. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here.

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

See Also
Piping Materials Class Rules (on page 174)
Clamp Selection Filter (on page 378)

Gasket Selection Filter

The **Gasket Selection Filter** node defines selection rules for the gaskets used for bolted joints in the model. You must make sure the actual service conditions of the pipeline do not exceed the gasket style limitations of maximum temperature, maximum pressure, and maximum P x T value. In general, a commodity part indicates in the **Gasket Requirement** option in the **Piping Commodity Material Control Data** to select the gasket from the gasket selection filter.

★ IMPORTANT   If you use the maximum temperature and pressure options in the **GasketSelectionFilter** sheet, make sure that you specify at least one set of temperature and pressure values for the pipe run on the **New Pipe Run** dialog box (**Temperature and Pressure** catergory). The values that you enter allow the software to select the appropriate gasket.

Bolted End Properties in Gasket Selection

You can base the selection of gaskets on only the Pressure Rating and the End Preparation properties of a bolted end. You can also optionally use the End Standard in the selection of gaskets. However, you must define the basis within a piping materials class uniformly and consistently. For example, you can base the selection of gaskets on Pressure Rating and End Preparation for one piping materials class, and the selection of gaskets for another piping materials class on Pressure Rating, End Preparation, and End Standard. Do not use both approaches within the gasket selection filter for the same piping materials class.

Fluid Codes in Gasket Selection

You can optionally choose to base the selection of gaskets on Fluid Codes. However, you must define the basis within a piping materials class uniformly and consistently. For example, you can base the selection of gaskets on Fluid Code for one piping materials class and choose to not base the selection of gaskets on Fluid Code for another piping materials class. Do not use both approaches within the gasket selection filter for the same piping materials class. For more information, see "Gasket Selection Based on Fluid Code" in *Model Options* (on page 434).

Alternate End Practice (Conditionally Required)

> Type the end practice for the other end when a second end preparation applies to the bolted joint.

Alternate End Preparation (Conditionally Required)

> Type the end preparation code for the other end when a second end preparation applies to the bolted joint. For example, small-grove-face lap-flanged end.

Alternate End Standard (Optional)

> Type the other end standard code when a second end standard applies to the bolted joint.

Alternate Pressure Rating (Conditionally Required)

> Type the other pressure rating code when a second pressure rating applies to the bolted joint.

Alternate Rating Practice

> Select the pressure rating practice.

Alternate Termination Class

> Select the termination class.

Alternate Termination Subclass

Select the termination subclass.

Alternate Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the gasket on the basis of the piping materials class. The Fabrication Type override cannot be specified explicitly for any applicable reportable piping commodity as determined by the piping commodity material control data. If the Fabrication Type override has been specified for the parent gasket, that value will be used for any applicable reportable piping commodity. This data is currently not used by the software.

You can specify a reportable piping commodity here based on the piping materials class, and can also specify a different reportable piping commodity that applies to all piping materials classes for the same gasket in the piping commodity material control data. The quantity of the reportable piping commodity defined here may differ from that of the reportable piping commodity in the piping commodity material control data.

Contractor Commodity Code (Required)

Type the contractor commodity code, which is the code that identifies the gasket that you want to use from the *Gasket Part Data Sheet* (on page 309) node.

End Practice

Select the end practice. The end practices are defined in the End Standard select list.

End Preparation (Required)

Type the end preparation code for the bolted joint.

End Standard (Optional)

Type the end standard code for the bolted joint. The end standards are defined in the End Standard select list.

Fabrication Class

Select the fabrication class. Fabrication classes are defined in the Fabrication Type select list.

Fabrication Type

Select the fabrication type. Fabrication types are defined in the Fabrication Type select list.

Gasket Option (Conditionally Required)

Type the gasket option code to use when the piping designer does not select a gasket type.

Maximum Temperature (Conditionally Required)

Specify the maximum temperature that the gasket is intended for in this piping material class. You must specify the maximum temperature if the gasket is not intended for the full temperature range of the corresponding piping material class.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this gasket applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this gasket applies.

NPD Unit Type (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For

example, type **in** for inches or **mm** for millimeters.

Piping Note 1 (Optional)

Specify the Standard Notes that you want to associate with the filter. Standard notes are defined in the **Piping** > **Piping Specification** > **Notes** node.

Pressure Rating (Conditionally Required)

Type the pressure rating code for the bolted joint. This property defines the envelope of pressure to which the bolted joint may be subjected.

Priority (Optional)

Type the priority value that this gasket should have when selecting gaskets for a bolted joint at a piping specification break, and the gasket requirements are different between the two piping materials classes. The lower the number, the higher the priority is for the gasket.

Quantity of Alt Reportable Parts (Optional)

Enter the number of alternate reportable piping commodities to be reported per instance of the gasket. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one. This data is currently not used by the software.

Quantity of Reportable Parts (Optional)

Type the number of items to be reported per instance of the gasket commodity. This value must be an integer. If you have defined a commodity code in the **Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one. This data is currently not used by the software.

Reportable Commodity Code (Optional)

Type the commodity code of the commodity that you want created with the primary commodity code object. For example, you may want a flange insulation kit reported for material control but not represented graphically in the model. You would enter the commodity code of the flange insulation kit here. This data is currently not used by the software.

You can specify a reportable piping commodity here based on the piping materials class, and can also specify a different reportable piping commodity that applies to all piping materials classes for the same gasket in the piping commodity material control data. The quantity of the reportable piping commodity defined here may differ from that of the reportable piping commodity in the piping commodity material control data.

Ring Number (Optional)

Enter the code representing the ring number for a ring joint gasket. This property is only required for the situation where the gasket's commodity code does not address the ring number.

Ring Number Practice (Conditionally Required)

Select the ring number practice.

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

Termination Class (Required)

Select the termination class.

Termination Sub Class (Required)

Select the termination sub class for the port.

See Also
Piping Materials Class Rules (on page 174)
Gasket Part Data Sheet (on page 309)
Gasket Selection Filter (on page 381)
Gasket Selection Filter for Nozzles (on page 476)

Nut Selection Filter

The **Nut Selection Filter** node defines selection rules for the nuts used for bolted joints in the model. You must ensure that the correct material grade is selected to match the recommended bolting temperature and stress ranges. The software passes the piping specification name, bolt type, and bolt diameter into this selection filter to retrieve the nut commodity code and the nut height option from the Nut Part Data.

Comments (Optional)

Specify an optional brief description of the commodity code.

Contractor Commodity Code (Required)

Type the contractor commodity code, which is the code that identifies the nut that you want to use from the *Nut Part Data Sheet* (on page 313).

Bolt Type (Required)

Select the bolt type.

Bolt Diameter (Required)

Specify the diameter of the bolt, including the unit indicator. For example, type **0.5 in** or **2 in**.

Fabrication Category Override (Optional)

Type the fabrication code.

Maximum Temperature (Conditionally Required)

Specify the maximum temperature that the nut is intended for in this piping material class. You must specify the maximum temperature if the nut is not intended for the full temperature range of the corresponding piping material class.

Nut Option (Conditionally Required)

Type the nut option code to use when the piping designer does not select a nut type.

Piping Note 1 (Optional)

Specify the Standard Notes that you want to associate with the filter. Standard notes are defined in the Piping > Piping Specification > Notes node.

Pressure Rating (Optional)

Define the pressure rating for the bolted joint. The software assumes that the nut selection will not vary when the pressure rating values for the two bolted ends are different but the drilling templates are still compatible (for example, Class 125 and Class 150). Therefore, only one pressure rating value is required for nut selection.

Rating Practice (Optional)

Select the pressure rating practice for the nut selection.

Supplementary Nut Option (Optional)

Specify another nut option code if a second nut is required for each machine bolt or each end of each stud.

Suppl Nut Cntr Commodity Code (Optional)

Type the contractor commodity code for the supplementary nut. This code identifies the nut that you want to use from the *Nut Part Data Sheet* (on page 313).

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

See Also
Piping Materials Class Rules (on page 174)
Nut Part Data Sheet (on page 313)
Nut Selection Filter (on page 384)

Piping Commodity Filter

The **Piping Commodity Filter** defines all the piping components associated with a particular piping material class. This rule uses the short code, option code, and nominal diameter as inputs to select a unique piping commodity code to use to access the piping part catalog.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity.

Associated Commodity Code (Optional)

Type a commodity code for the associated stub end object to place when the piping designer places a backing flange as the primary commodity code item. This code is used to associate a stub end with a backing flange to create a lap joint flange assembly.

Bend Radius (Optional)

Type an optional allowable bend radius as an absolute value. If you define a value in this column, do not define a value in the **Bend Radius Multiplier** column. This value is required only for pipe bends.

Bend Radius Multiplier (Optional)

Type an optional NPD multiplier that you want to use to define the bend radius. This value is required only for pipe bends. The bend radius for elbows is defined in the Piping Commodity Class Data. If you define a value for the bend radius multiplier, the *Pipe Bend Radius Multiplier Rule* (on page 408) for the piping specification determines how the absolute bend radius is computed from the pipe bend radius multiplier. If you define a value in this column, do not define a value in the **Bend Radius** column.

Comments (Optional)

Type an optional brief description of the piping commodity item.

Commodity Code (Required)

Type the commodity code. The commodity code is the code with which the part is identified in the market. The commodity code along with the nominal piping diameter and schedule values uniquely define the piping commodity. The commodity code can be size-dependent or size-independent. The size-independent commodity code can be mapped to the size-dependent Smart 3D Reference Data identification number from the Piping Commodity Procurement data.

Commodity Option (Optional)

Type an option code. If you select **Default**, the default commodity defined in the *Default Piping Commodity Selection Rule* (on page 468) is used. The option code gives the software a way of recognizing the default component when more than one component works. This code is also used when selecting a branch fitting. This option is ignored in the automated selection of flanges.

Engineering Tag (Optional)

Type the valve tag number. Engineering tags are used for valves on P&IDs instead of longer commodity codes. A one-to-one relationship exists between the valve tag number and the commodity code. Valve tags are useful for automated annotation on orthographic and isometric drawings because the valve tag is shorter than the corresponding commodity code. Piping designers can use engineering tags to select valves in the model.

Fabrication Category Override (Optional)

Type the fabrication category code. The fabrication code identifies whether the component is shop- or field-fabricated.

First Size From (Required)

Defines the lower bound of the largest nominal piping diameter for which this piping commodity applies within the Piping Materials Class.

First Size Schedule (Conditionally Required)

Type the schedule or thickness code for the first size end of this piping commodity. This column is required when the commodity code does not include a schedule. If you enter a thickness code, the units of measurement for the wall thickness can be different from the units of measurement for the nominal piping diameter.

You can also use the keyword MATCH to have the piping commodity use the same schedule as the pipe for the component. If you use MATCH, the commodity code for the part **First Size Schedule** and **Second Size Schedule** columns must be set to a valid size. MATCH works only if the commodity code does not contain the schedule size.

If the schedule is a result of a wall thickness calculation, type the value for the **Design Standard** property as defined in the calculation Prog ID.

First Size To (Required)

Defines the upper bound of the largest nominal piping diameters for which this piping commodity applies within the Piping Materials Class.

First Size UOM Basis In Catalog (Optional)

Specifies the units of measure basis code.

First Size Units (Required)

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could type **in** for inches or **mm** for millimeters.

Fluid Code (Optional)

Specify the fluid code for which the piping commodity is permitted to be used. The software does not use this data in this version.

Fluid System (Optional)

Specify the fluid system for which the piping commodity is permitted to be used. The software does not use this data in this version.

Jacketed Piping Basis (Conditionally Required)

Type a jacketed piping code to indicate whether the piping commodity is required for the core piping, the jacketed piping, or the jumper tubing. This option allows the piping designer to select fittings from the same piping materials class on the basis of whether the core, the jacket, or the jumper is being modeled. The software does not use this data in this version.

Maximum Temperature (Conditionally Required)

Specifies the maximum temperature for which this piping commodity is intended within this piping materials class. Include the units of measure, **F** or **C** for example, when specifying this value. A maximum temperature is required for those piping commodities that are not suitable for the full range of temperature for which the piping materials class is intended.

Minimum Temperature (Conditionally Required)

Specifies the minimum temperature for which this piping commodity is intended within this piping materials class. Include the units of measure, **F** or **C** for example, when specifying this value. A minimum temperature is required for those piping commodities that are not suitable for the full range of temperature for which the piping materials class is intended.

 NOTE Be careful if you decide to define values for **Maximum Temperature** and **Minimum Temperature** because the user must type a temperature for the pipe run before the software will find the commodity. An alternate, better method is to use the **ServiceLimits** sheet in the **Piping Specification.xls** workbook. For more information, see *Service Limits* (on page 419).

Multisize Option (Conditionally Required)

Type a string to represent an optional piping commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column, is used.

 NOTE You can append the keywords **Primary** (primary size) and **Secondary** (secondary size) to the column headings for the nominal piping diameters at each end in the workbook for the part data to assign the size to a specific piping point instead of using the **Multisize Option** property. Fittings that require two sizes will be assumed to have the primary size assigned to the first piping point and the secondary size assigned to the second piping point. Multi-size fittings with three or more sizes must have the sizes assigned to the appropriate piping points by means of the multi-size option property. Fittings with exactly two

sizes and three or more piping points may have the size assigned to the appropriate piping point by using these keywords.

Number Of Miter Cuts (Optional)

Type the number of miter cuts required for a mitered elbow. This value must be a positive integer. This value is required only for mitered elbows. This box is optional in that the piping designer can specify the number of miters during placement.

PDS Modifier (Optional)

Tracks the modifier from any specs translated from PDS to Smart 3D. The software does not use this data.

Piping Note 1 (Optional)

Specify the standard notes that you want to associate with the commodity. Standard notes are defined in the Piping > Piping Specification > Notes node.

Preferred Pipe Length (Optional)

Specify the preferred pipe length for plain piping. This allows the specification writer to define the company preference for either design or procurement considerations.

Quantity of Alt Reportable Parts (Optional)

Specifies the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts (Optional)

Type an integer value that represents the quantity of objects to be reported per instance of the piping commodity. Typically, this value is one, but the value may be greater than one.

Reportable Commodity Code (Optional)

Type a commodity code for the object to create when the piping designer places a primary commodity code item. For example, you might want a paddle spacer reported for each instance of a paddle blind placed in the model. In this case, the paddle spacer is reported, but not graphically placed in the model.

Second Size From (Conditionally Required)

Defines the lower bound of the next largest nominal piping diameter for which this piping commodity applies within the Piping Materials Class.

Second Size To (Conditionally Required)

Defines the upper bound of the next largest nominal piping diameters for which this piping commodity applies within the Piping Materials Class.

Second Size Schedule (Conditionally Required)

Type the schedule or thickness code for the second size end of this piping commodity. This column is required when the commodity code does not include a schedule. If you enter a thickness code, the units of measurement for the wall thickness can be different from the units of measurement for the nominal piping diameter.

You can also use the keyword MATCH to have the piping commodity use the same schedule as the pipe for the component. If you use MATCH, the commodity code for the part **First Size Schedule** and **Second Size Schedule** columns must be set to a valid size.

MATCH works only if the commodity code does not contain the schedule size.

Second Size UOM Basis In Catalog (Optional)

Specifies the units of measure basis code.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could type **in** for inches or **mm** for millimeters.

Selection Basis (Conditionally Required)

Specifies the selection basis.

If you set this option to "Fitting requires validation of commodity-specific Service Limits rule" or "Fitting plus reportable piping commodity requiring validation of commodity-specific Service Limits rule", then the software uses the commodity specific service limits that are define in *Piping Commodity Service Limits* (on page 340).

If you set this option to "Branch Fitting by User", then that branch fitting commodity filter item is available as a manual override of the branch fittings defined in the branch table.

Short Code (Required)

Type a short code for this row. A short code is used as a grouping or designation for each component so you can select the component. The short code appears in the **Type** box on the **Place Component** ribbon. The software also uses the short code to automatically place components. Some examples of short codes that you might use are: Piping, Nipple, Gate Valve, Lift Check Valve, Tee, and Weld Neck Flange. Short codes are defined on the **Tools > Options** dialog box on the **Short Codes** tab. For more information, see *Short Codes Tab (Options Dialog Box)* (on page 976).

A full-size branch (weldolet or reinforcing pad) requires a different short code than a reducing branch. You need to create one entry in the piping commodity filter to address the full-size reinforcing pads and a second entry to address the reducing reinforcing pads. This is required to prevent users from unintentionally using a full-sized branch.

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Piping Materials Class Data

The **Piping > Piping Specification > Piping Materials Classes >** *spec name* **> Piping Materials Class Data** node displays information about the piping material class.

Approval Date (Optional)

Type the time or date the status of the piping materials class was approved.

Approved By (Optional)

Type the name of the person or group who approved the status of the piping materials class.

Automated Flange Selection Option (Optional)

Select enabled to activate the automated flange selection logic to distinguish between flanges inserted on plain piping versus fitting-to-fitting situations. Typically, you would enable this option for piping material classes that include slip-on flanges or lap-joint flanges. For more information, see *Automated Flange Selection* (on page 370).

- If disabled, the generic short code for the flange that is subject to automated flange selection is used for this piping material class.

- If enabled, the software selects the generic short code for the flange for plain piping or selects the flange for a fitting based on where the flange is inserted.

Comments (Optional)

Type a brief comment describing the justification for the piping materials class status.

Design Standard (Optional)

Specify the design standard that you want to use in this piping materials class to calculate the piping wall thickness and the branch reinforcements.

Examination (Optional)

Defines the standard to use for examinations, inspections, and testing.

Fluid Service (Optional)

Type the intended fluid service for this piping materials class. You may want to include the physical state of the fluid. Examples are, **Potable Water**, **High Pressure Steam**, **Underground Water**, or **Chilled Water**. In the case of a jacketed piping specification, this property represents the fluid service for the core.

Gasket Requirement Override (Optional)

Specify the gasket override code for the piping material class.

Hyperlink To Human Spec (Optional)

Specify the location of the electronic version of the piping materials class. You can specify the location using the http:// protocol or by using a Universal Resource Location (URL) address (for example, \\server\share).

Jacket and Jumper Fluid Service (Optional)

Type the intended fluid service for jackets and jumpers in this piping materials class. You may want to include the physical state of the fluid. Examples are, **Potable Water**, **High Pressure Steam**, or **Chilled Water**.

Jacket Material Of Construction Class (Optional)

Select the material of construction class for the jacket.

Jacket Materials Description (Optional)

Type a generic description of the material used for jackets in this piping materials class. An example is, **CL150, Carbon Steel, RFFE, Trim 8, < 2" SWE, >= 2" BE**. Do not include the intended fluid service or applicable corrosion allowance.

Jumper Material of Construction Class (Optional)

Select the material of construction class for the jumper.

Last Modified On (Optional)

Type the time or date the status of the piping materials class was set.

Lining Material (Optional)

Select the type of lining material (for example, cement-mortar, concrete, epoxy, rubber, or plastic lining) required for the field lining of plain piping within this piping materials class. If you do not specify a value, the software assigns a default value of "Undefined".

Lining Requirements (Optional)

Specify whether or not field lining is required in this piping material class. If you set this to "Lined", you need to define information in the *Field Lining Thickness* (on page 399) rule.

Materials Description (Optional)

Type a generic description of the material used for this piping materials class. An example is, **CL150, Carbon Steel, RFFE, Trim 8, < 2" SWE, >= 2" BE**. Do not include the intended fluid service or applicable corrosion allowance. This property is used in reporting.

Materials Group (Optional)

Defines the material group for the materials class.

Materials Type (Optional)

Defines the material type for the materials class.

Materials of Constructions Class (Optional)

Select the material of construction class. This option is used for grouping similar piping material classes for the benefit of the specification writer in managing piping specifications.

Piping Commodity Override Option (Optional)

Specify whether you want to disable, enable with no justification required, or enable with justification required the ability of a piping designer to override the piping materials class to select a piping commodity manually.

NOTE This setting overrides the piping commodity override option setting on the **Model Options** node for this piping material class.

Piping Note 1 (Optional)

Specify the standard notes that you want to associate with the piping materials class. Standard notes are defined in the **Piping** > **Piping Specification** > **Notes** node.

Piping Spec Status (Optional)

Defines the status of the piping materials class.

Responsibility (Optional)

Type the name of the person or group responsible for specifying the status of the piping materials class.

Revision Number (Optional)

Type the revision number of the piping materials class. If you have enabled the **Piping Spec Version Management Option** in the **Model Options** node, the text that you enter here is appended to the end of the piping specification name. For example, if the piping specification is originally named 1C0100, the piping specification with the revision is named "1C0100, Rev: *<text>*". You must change this revision number manually each time you make a change to a piping specification.

Spec Name (Required)

Type a name for the piping material class that you are defining. The software displays this name on the interface. All names must be unique.

Stress Relief (Optional)

Defines the stress relief standard to use for the piping materials class. Stress-relieving heat treatment reduces residual stresses resulting from bending and welding.

Stress Relief Requirement (Optional)

Defines the stress relief requirement for the material class. If you do not define a value, the software assigns a value of 1 (Undefined) by default.

Washer Creation Option (Optional)

Specifies whether or not the software should create washers at a bolted joint.

See Also

Piping Materials Class Rules

Piping Materials Class Rules apply to individual material classes that you have defined in your piping specification. You should customize the rules based on what makes sense for your company.

What do you want to do?

- Define Allowable Fluid Codes
- *Define Allowable Pipe Bend Radii*
- *Define Auto Router Cost Evaluation*
- *Define Auto Router Pipe Rack Spacing*
- *Define Bend Angles*
- Define Bolt Length Lookup Rule
- *Define Bolt Selection Filters*

- *Define Takedown Parts* (on page 197)
- *Define Thickness Data* (on page 198)
- *Define Washer Selection Filters* (on page 198)
- *Define Weld Clearance* (on page 199)
- *Define Weld Gap* (on page 199)

Bend Angles

The **Bend Angles** rule lists the preferred angles in the route pipe ribbon bar for the different NPD when routing a turn feature and the working plane is active.

Bend Angle (Required)

Type the bend angle you want to allow. Be sure to include the units of the angle. For example, type **90 deg**.

NPD (Required)

Type the nominal pipe diameter (NPD) for which you want to define a valid bend angle.

NPD Unit Type (Required)

Specify the units for the nominal pipe diameter value you entered in the **NPD** column. For example, type **mm** or **in**.

See Also
Piping Materials Class Rules (on page 174)

Branch Table

The **Branch Table** node defines the rules for selecting a short code for the automatic insertion of branches. The rules for selecting the short code are based on the header and branch diameter and the angle. The type of branch fittings that can be selected by this rule include a tee, a reducing tee, a tee with a reducing insert or a bushing, a lateral, an olet-type branch, a reinforcing weld, a reinforcing pad, a half coupling, and so forth. If you want to provide optional branches for manual insertion to override the branch rule, you need to create entries in the **Piping Commodity Filter** and set the **Selection Basis** for those entries to "Branch Fitting by User".

If the short codes do not display in the branch table, click **Tools > Options** and then select the **Short Codes** tab. Define or edit the short codes as needed, or to accept the default short codes, simply click **OK**.

After the short code is identified, the software goes to the *Piping Commodity Filter* (on page 385) to lookup the short code. When the short code is found on the **Piping Commodity Filter** sheet, the corresponding commodity code is found to find the correct part.

Angle Low (Required)

Type the minimum angle for this short code to be considered.

Angle High (Required)

Type the maximum angle for this short code to be considered.

Branch Size (Required)

Type the branch size for this short code to be considered. You define the units for this size in the **BrSizeNPDUnitType** column.

Br Size NPD Unit Type (Required)

Specify the units for the branch maximum and minimum sizes that you have defined in the **BranchSize_Lo** and **BranchSize_High** columns. For example, you can type **m**, **cm**, **mm**, **ft**, or **in**.

Header Size (Required)

Type the header size for this short code to be considered. You define the units for this size in the **HdrSizeNPDUnitType** column.

Hdr Size NPD Unit Type (Required)

Specify the units for the header maximum and minimum sizes that you have defined in the **HeaderSize_Lo** and **HeaderSize_High** columns. For example, you can type **m**, **cm**, **mm**, **ft**, or **in**.

Secondary Short Code (Optional)

Type an optional short code for this size and angle range. A value is required here only when branch reinforcement calculations are being used, and a size reducing branch applies. This short code represents a branch of more strength than the primary short code, but less strength than the tertiary short code.

Short Code (Required)

Type the short code to use for this size and angle range. The software uses this short code to find the commodity code on the **Pipe Spec** sheet. If branch reinforcement calculations are being used, and a size reducing branch applies, this short code represents the branch of least strength.

Spec Name (Required)

Type the name of the piping materials class for which you are defining pipe branch rules. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

Tertiary Short Code (Optional)

Type an optional short code for this size and angle range. A value is required here only when branch reinforcement calculations are being used, and a size reducing branch applies. This short code represents the strongest branch.

See Also
Define Branch Selection Criteria (on page 178)

Cap Screw Length Calculation Tolerance

The **Cap Screw Len Cal Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the cap screw length. This node contains all the default values that the software is to use.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance to use for the bolt length calculation based on the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

Corrosion Allowance

The **Corrosion Allowance** node specifies the corrosion allowance used in the calculation of piping commodities wall thickness where the thickness is not specifically included in the piping materials class.

The use of the **Materials Category** property and the **Fluid Code** property is optional. However, if you choose to specify the **Corrosion Allowance** on the basis of the Piping Materials Class and the **Materials Category**, you must specify values of **Corrosion Allowance** for each value of **Materials Category** that is applicable to that Piping Materials Class. Likewise, if you choose to specify the **Corrosion Allowance** on the basis of the Piping Materials Class and the **Fluid Code**, you must specify values of **Corrosion Allowance** for each value of **Fluid Code** that is applicable to that Piping Materials Class.

Corrosion Allowance (Required)

Specify the corrosion allowance to use in wall thickness and branch reinforcement calculations including the units, for example, **0.0625in**.

Fluid Code (Optional)

Specify the code for the fluid for which you want to define corrosion allowance.

Materials Category (Optional)

Specify the code for the material grade for which you want to define a corrosion allowance.

See Also
Piping Materials Class Rules (on page 174)

Default Change of Direction Per Spec

The **Default Change of Direction** rule under the piping material class node defines the default boundaries for change-of-direction fittings. The boundaries defined here are the exceptions per piping materials class to the default boundaries defined in the *Default Change of Direction* (on page 468) under the **Model Rules** node.

Bend Angle From (Required)

Enter the lower boundary for the bend angle. This value must match the **Bend Angle To** value on the previous row.

Bend Angle To (Required)

Enter the upper boundary for the bend angle. This value must match the **Bend Angle From** value for the next row.

Functional Short Code (Required)

Enter the functional short code to use to access the piping commodity filter for the change-of-direction fitting.

 NOTE Functional short codes for change-of-direction fittings are defined on this sheet, not on the *Piping Commodity Filter* (on page 385).

See Also
Piping Materials Class Rules (on page 174)

Exterior Coating and Surface Treatment

The **Exterior Coating and Surface Treatment Rule** node defines the outside coating, surface, and heat treatments based on the piping diameter and piping materials class. This is an optional rule.

Auxiliary Treatment (Optional)

Specify the auxiliary treatment.

Auxiliary Treatment Requirement (Optional)

Specify if an auxiliary treatment, such as a heat treatment, is required.

Coating Requirement (Optional)

Specify the coating requirement. The coating requirements are defined in the **Coating Type** select list.

Coating Type (Optional)

Specify the coating type.

Environmental Zone (Optional)

Specify the environment in which the piping is located.

Nominal Piping Diameter From (Required)

Type the lower bound piping diameter for the surface treatment.

Nominal Piping Diameter To (Required)

Type the upper bound piping diameter for the surface treatment.

Nominal Piping Diameter Units (Required)

Specify the units for the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns. For example, type **mm** or **in**.

Outside Surface Treatment Requirement (Optional)

Specify the exterior surface treatment requirement. The exterior surface treatment requirements are defined in the **Exterior Surface Treatment** select list.

Outside Surface Treatment (Optional)

Specify the exterior surface treatment for the specified piping materials class and piping diameters.

See Also

Piping Materials Class Rules (on page 174)

Field Fit Length

The **Field Fit Length** node defines the extra length of pipe to add for field fit welding. This rule only applies to field fit welds and not to shop welds or field welds. If, for a field fit weld, no matching criteria is defined in this rule, the software reports an error and the field fit welded connection is not created. The extra length is not shown graphically in the model but will cause an increase in the reported pipe lengths.

Although **Weld Type** is used to select which field fit length is used from this rule, the field fit length is only applied to the pipe cut length calculation when the **Weld Class** is set to "By Pipe Erector, Field Fit" or "By Pipe Erector for Loose Material."

Construction Requirements End 1 (Required)

Type the construction requirement codelist value for end 1.

Construction Requirements End 2 (Required)

Type the construction requirement codelist value for end 2.

Field Fit Length (Required)

Specify the field fit length to use when computing the cut length of plain piping for the defined weld type, diameter, and construction requirements. Include the units of measurement, in or mm for example, when defining this value. The length is annotated as A in the figure.

Nominal Piping Diameter From (Required)

Specify the lower diameter bound for which the field fit length applies.

Nominal Piping Diameter To (Required)

Specify the upper diameter bound for which the field fit length applies.

Nominal Piping Diameter Units (Required)

Specify the units of measurement, for example in or mm, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Weld Class

Select the weld class for which you want to define a field fit length.

Weld Type (Required)

Select the weld type for which you want to define a field fit length.

See Also
Field Fit Length (on page 398)
Reinforcing Weld Data (on page 418)
Weld Clearance Rule (on page 424)
Weld Gap Rule (on page 425)
Weld Model Representation Rule (on page 499)
Weld Type Rule (on page 500)

Field Lining Thickness

The **FieldLiningThickness** sheet in the **Piping.xls** workbook defines the liner thickness to add to the flange thickness so that bolt lengths can be computed correctly. This rule is only applied when the **Lining Requirement** property of the Piping Materials Class Data is set to "Lined".

Spec Name (Required)

Type the name of the piping material class for which you are defining the field lining thickness. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

Nominal Piping Diameter From (Optional)

Enter the lower diameter bound for which the field lining thickness applies.

Nominal Piping Diameter To (Optional)

Enter the upper diameter bound for which the field lining thickness applies.

Nominal Piping Diameter Units (Optional)

Specify the units of measurement, for example **in** or **mm**, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Liner Thickness Inside Diameter (Required)

Specify the thickness of the lining material at the inside diameter of field-lined fittings.

Liner Thickness on Face of Flange (Required)

Specify the thickness of the lining material at the face of the flange at any field-lined bolted fittings. A gap will appear in the model between the two flange faces equal to the distance defined here. This gap is the "saved" physical space between the flanges in the real world for the liner to go during construction.

See Also
Piping Materials Class Rules (on page 174)

Flared Pipe Per Spec

The **FlaredPipePerSpec** sheet in the **Piping.xls** workbook defines the lap length and lap thickness for flared pipes based on the nominal piping diameter and the schedule thickness. This rule causes an increase in the reported pipe lengths to account for the installation method. The information defined on this sheet is the exceptions per piping materials class to the default flared pipe information defined on the *Flared Pipe* (on page 474).

This rule only applies to pipe that is flared by the fabrication shop, not to flared pipe spools that can be purchased from a manufacturer.

This rule is used when you set the **Selection Basis** option to either "Continuous pipe bend flared" or "Plain piping ends flared" in the **Piping Commodity Filter**. Also, flared pipe is determined by a lap joint flange at the pipe end, where the lap joint flange is recognized by the Piping Commodity Subclass of "Lap Joint Flanges". If the lap joint flange has not been associated with a stub end as a reportable piping commodity in the piping commodity filter, the software assumes that the lap flange is being used with flared pipe.

Spec Name (Required)

> Type the name of the piping material class for which you are defining the flared pipe information. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

Nominal Piping Diameter (Required)

> Enter the pipe diameter for which the flared pipe information applies.

Nominal Piping Diameter Units (Required)

> Enter the unit of measurement, **in** or **mm** for example, for the value in the **Nominal Piping Diameter** column.

Schedule Thickness (Optional)

> Type the schedule thickness short description for the pipe. Valid short descriptions are listed in the **AllCodeLists.xls** workbook on the **ScheduleThickness** sheet in the **Schedule Thickness Short Description** column.

Lap Length (Required)

> Specify the extra length to add to the pipe. This extra length is used to form the flared lip and is similar to a field fit in that the pipe length delivered to the field is longer than the dimension on the isometric drawing. The **Lap Length** is annotated as A in the figure.
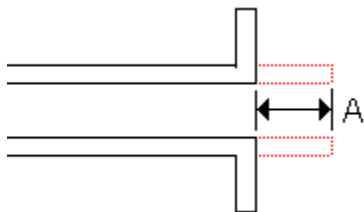
Lap Thickness (Required)

> Specify the thickness of the flared lip. This value is added to the flange thickness, and the sum thickness is used in the display of the joint in the model.

See Also
Piping Materials Class Rules (on page 174)

Flexible Hose Assembly Rule

The **Flexible Hose Assembly Rule** node defines the reference data needed to route flexible pipe in the **Piping** task.

Acceptable Alignment Tolerance End 1 (Required)

Enter the maximum angle for mis-alignment at end 1.

Acceptable Alignment Tolerance End 2 (Required)

Enter the maximum angle for mis-alignment at end 2.

End 1 Fitting Commodity Option Code (Optional)

Select the commodity option type for the end 1 fitting.

End 2 Fitting Commodity Option Code (Optional)

Select the commodity option type for the end 2 fitting.

Flexible Hose Topology Type (Required)

Select whether the flexible hose assembly is a radial, offset, or traveling loop type.

Flexible Hose Assembly Option (Required)

Select the assembly option. This option is defined in the FlexHoseAsmOption select list.

Flexible Hose Assembly Option Category (Required)

Select the assembly option category. This option is defined in the FlexHoseAsmOption select list.

Flexible Hose Assembly Tag (Required)

Enter a name to identify this flexible hose assembly. Users will use this name in the Route Flexible Hose command in Piping to select which flexible hose they want to place.

Flexible Hose Commodity Option Code (Required)

Select the commodity code for the flexible hose.

Maximum Bend Angle (Optional)

Specify the maximum bend angle for flexible hoses in this assembly.

Maximum Bend Radius (Optional)

Specify the maximum bend radius for flexible hoses in this assembly.

Maximum Total Length (Required)

Specify the maximum length for flexible hoses in this assembly.

Minimum Bend Angle (Required)

Specify the minimum bend angle for flexible hoses in this assembly.

Minimum Bend Radius (Required)

Specify the minimum bend radius for flexible hoses in this assembly.

Minimum Bend Tangent Length (Required)

Specify the minimum bend tangent for flexible hoses in this assembly.

Minimum Total Length (Required)

Specify the minimum length for flexible hoses in this assembly.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this flexible hose assembly applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this flexible hose assembly applies.

NPD Unit Type (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Round Up Increment Length (Required)

Enter the distance to round up the hose length to. For example, if the hose is 53 1/2 inches and you enter 1 inch here, the hose length will be rounded up to 54 inches.

Interior Coating and Surface Treatment

The **Interior Coating and Surface Treatment Rule** node defines the interior coating and surface treatments based on the piping diameter, fluid code, and piping materials class.

Coating Requirement (Optional)

Specify the coating requirement. The coating requirements are defined in the **Coating Type** select list.

Coating Type (Optional)

Specify the coating type.

Fluid Code (Optional)

Specify the fluid code.

Fluid System (Optional)

Specify the fluid system. The fluid systems are defined in the **Fluid Code** select list.

Nominal Piping Diameter From (Required)

Type the lower bound piping diameter for the surface treatment.

Nominal Piping Diameter To (Required)

Type the upper bound piping diameter for the surface treatment.

Nominal Piping Diameter Units (Required)

Specify the units for the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns. For example, type **mm** or **in**.

Interior Surface Treatment Requirement (Optional)

Specify the interior surface treatment requirement. The interior surface treatment requirements are defined in the **Interior Surface Treatment** select list.

Interior Surface Treatment (Optional)

> Specify the interior surface treatment code for the specified piping materials class and piping diameters.

See Also
Piping Materials Class Rules (on page 174)

Joint Quality Factor

The **Joint Quality Factor** node defines the joint quality factor (e) to use in wall thickness and branch reinforcement calculations on the basis of the nominal diameter range.

Commodity Option (Conditionally Required)

> Select the optional commodity selection. The default commodity option represents the pipe stock to use when the piping designer has not explicitly select one. Examples of when to use this include: pipe stock based on schedule, tubing based on schedule, optional fitting with a different design code than the default, and an optional choice for pipe stock or tubing.

Joint Quality Factor (Required)

> Type the joint quality factor. Enter this value as a percentage, for example, 95 or 100.

Option Category (Conditionally Required)

> Select the commodity option category.

Nominal Diameter From (Required)

> Define the lower bound of the largest nominal piping diameter for which this joint quality factor applies.

Nominal Diameter To (Required)

> Define the upper bound of the largest nominal piping diameter for which this joint quality factor applies.

NPD Unit Type (Required)

> Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

See Also
Piping Materials Class Rules (on page 174)

Machine Bolt Length Calculation Tolerance

The **Machine Bolt Length Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the machine bolt length. This sheet contains all the default values that the software is to use.

Bolt Diameter From (Required)

> Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

> Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance to use for the bolt length calculation based on the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

Mechanical Joint Allowable Pipe End Separation Rule

The **Mechanical Joint Allowable Pipe End Separation Rule** node specifies the allowable metal-to-metal gap between the two pipes at a mechanical joint for a given NPD.
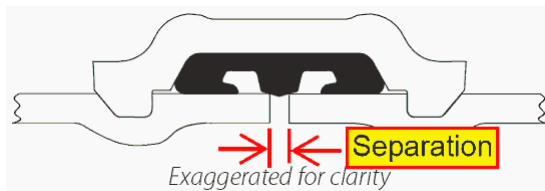
Geometric Industry Practice (Optional)

Select the source used in the preparation of the separation rule.

Geometric Industry Standard (Required)

Select the source used in the preparation of the separation rule.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this end separation applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this end separation applies.

Nominal Piping Diameter Units (Required)

Specify the units for the nominal pipe diameter value you entered in the **Nominal Piping Diameter From/To** columns. For example, type **mm** or **in**.

Pipe End Separation (Required)

Specify the end separation distance. Be sure you specify the units of measure when defining this value.

Minimum Pipe Length Rule for Purchase Length Pipe Per Spec

The **Minimum Pipe Length Rule for Purchase Length Pipe** node defines the minimum pipe length and the preferred minimum pipe length for piping that is only available for purchase in fixed lengths. You define these minimum lengths based on the nominal piping diameter. Use this sheet to override the settings on the **Model Rules > Minimum Pipe Length Rule for Purchase Length Pipe** rule on a per piping materials class basis.

The length information defined here should be considered design rules. The actual minimum length of pipe that can be purchased is defined at the pipe stock part level in the **Minimum Pipe Length** box (each pipe part has its own minimum pipe length as part of its definition).

Spec Name (Required)

Type the name of the pipe specification for which you are defining valid bend angles. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

Nominal Piping Diameter (Required)

Type the nominal diameter for which the minimum pipe length applies.

Nominal Piping Diameter Units (Required)

Specify the units for the nominal pipe diameter value you entered in the **Nominal Piping Diameter** column. For example, type **mm** or **in**.

Purchase Length (Required)

Specify the purchase length for the piping for which the minimum pipe length applies.

Minimum Pipe Length (Required)

Type the minimum length for the pipe that you want to allow for this nominal diameter. The software will not let you place pipe shorter than this value. Be sure to include the units, for example, **0.5in** or **1.375mm**.

Preferred Minimum Pipe Length (Required)

Type the preferred minimum pipe length for this nominal diameter. Be sure to include the units, for example, **0.5in** or **1.375mm**. The software generates a warning that results in an inconsistency when you place pipe shorter than this value, but does not prevent placement of the pipe.

📝 **NOTE** The value in the **Minimum Pipe Length** column should be less than the preferred minimum pipe length that you enter here.

Minimum Pipe Length Rule for Random Length Pipe Per Spec

The **Minimum Pipe Length Rule for Random Length Pipe** node defines the minimum pipe length and the preferred minimum pipe length for piping that is available for purchase in random lengths. You define these minimum lengths based on the nominal piping diameter. Use this node to override the settings on the **Model Rules > Minimum Pipe Length Rule for Random Length Pipe** rule on a per piping materials class basis.

The software assumes that the minimum pipe length value includes any length required to address socket depth for socket weld configurations. For example, you intend to insert pipe stock between two socket weld valves, where the socket depth is 1/2 inch. The minimum pipe length between the two female hubs is to be 2 inch. You must create the minimum pipe length in this rule as 3 inches, 2 + 1/2 + 1/2 = 3.

Spec Name (Required)

Type the name of the piping materials class for which you are defining minimum component data. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

NPD (Required)

Type the nominal pipe diameter for which you want to define the minimum dimensions.

NPD Unit Type (Required)

Specify the units for the nominal pipe diameter value that you entered in the **NPD** column. For example, type **mm** or **in**.

Minimum Pipe Length (Required)

Type the minimum length for the pipe that you want to allow for this NPD. The software will not let you place pipe shorter than this value.

Preferred Minimum Pipe Length (Required)

Type the preferred minimum pipe length. If you try to place pipe that is shorter than this value, the software displays a warning and reports an inconsistency but does allow you to place the pipe.

See Also
Piping Materials Class Rules (on page 174)

Permissible Nominal Piping Diameters Rule

You use the **Permissible Nominal Piping Diameters Rule** node to define what nominal pipe diameters (NPD) are valid for the different piping materials classes. These NPDs appear on the **New Pipe Run** dialog box in the **Nominal Diameter** box and are used to create entries in the branch table.

It is your responsibility to make certain that each piping commodity within the piping materials class, each size combination in the Branch Intersection rule, and each tap size in the Permissible Taps rule is consistent with the list of permissible nominal piping diameters defined here. The specific permissible values represented by a size range for a specific piping commodity will be limited to the values specified by the rule that fall within that range.

Nominal Diameter (Required)

Type the nominal pipe diameter that you want available for the piping materials class.

Unit Type (Required)

Specify the units for the nominal pipe diameter value that you entered in the **NPD** column. For example, type **mm** or **in**.

⬛ **NOTE** The **Permissible Nominal Piping Diameters Rule** node in the **Catalog** task defines the same rules as does the **Pipe Nominal Diameters** sheet in the **Piping Specification.xls** workbook. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

See Also
Define Allowable Nominal Piping Diameters (on page 192)

Permissible Pipe Bending Machine

The **Permissible Pipe Bending Machine** rule defines which pipe bending machines are available for which piping materials class and NPD size.

Nominal Piping Diameter From (Required)

Enter the lower diameter bound for which the pipe bending machine applies.

Nominal Piping Diameter To (Required)

Enter the upper diameter bound for which the pipe bending machine applies.

Nominal Piping Diameter UOM (Required)

Specify the units of measurement, for example **in** or **mm**, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Pipe Bending Machine Name (Required)

Type the bending machine code that you want to allow in the piping material class. The bending machines codes are defined in the **Pipe Bending Machine Name** column on the **PipeBendingMachineData** sheet. The sheet is located in the **Pipe Bending Manufacturability Rules.xls** workbook.

See Also
Pipe Bending Data (on page 200)

Permissible Taps

The **Permissible Taps** node defines the preferred tap and a list of permissible taps for a piping materials class. This rule is intended to be used for taps that are created by the piping designer versus taps that are created in the piping catalog. That is to say, when a piping designer goes to place a tap, the software checks this rule to get all the taps that are allowed for the active piping materials class. The software then goes to the Tap Property Data node to retrieve the tap information to display to the piping designer.

Permissible Tap Number (Required)

Enter the tap number that you want to allow in the piping materials class. The tap number must be defined in *Tap Properties* (on page 502).

Is Preferred Tap (Required)

Enter **TRUE** if the tap number is the preferred tap. Enter **FALSE** if the tap is not the preferred tap. You can have only one tap set to **TRUE** per specification name. If you do define more than one tap as true, the first tap in that specification is used and the other tap is treated as being set to false.

See Also
Piping Materials Class Rules (on page 174)
Tap Properties (on page 502)

Pipe Bend Radius Multiplier Rule

You use the **Piping > Piping Specifications > Model Rules > Pipe Bend Radius Multiplier Rule** node in the Catalog tree view to specify the absolute bend radius value for pipe bends based on the nominal piping diameter and the pipe bend radius multiplier as specified in the piping commodity filter. Specifying the bend radius multiplier independently of the commodity option assumes that the bend radius is the only type of option ever required for change-of-direction fittings.

Nominal Piping Diameter (Required)

Type the nominal pipe diameter for which you want to define bend radii.

Nominal Piping Diameter Units (Required)

Specify the units for the **NPD** column. For example, type **mm** or **in**. If the Nominal Piping Diameter Equivalence rule exists in this Piping Specification, the data for this rule is determined by the nominal piping diameter in the primary system of units, which is represented by the active size defined by the piping designer in the 3D model. Or the data for this rule is determined by of the nominal piping diameter in the secondary system of units, as defined by the Nominal Piping Diameter Equivalence rule, if data has not been defined for the value of nominal piping diameter in the primary system of units.

Pipe Bend Radius Multiplier (Required)

Type the pipe bend radius multiplier for which the absolute pipe bend radius applies.

Absolute Pipe Bend Radius (Required)

Type the absolute radius for a pipe bend.

See Also
Define Allowable Pipe Bend Radii (on page 175)

Pipe Bending Elongation Per Spec

The **Pipe Bending Elongation Per Spec** rule under the **Piping Materials Class Rules** node defines the amount of "stretch" that occurs to the pipe length during the piping bending process. You can define the "stretch" length by doing one of the following:

- Specifying the amount of pipe elongation per unit of bend angle for each applicable nominal piping diameter and bend radius.

- Specifying the pipe elongation values at a specific bend angle for each applicable nominal piping diameter and bend radius.

- Specifying the pipe elongation values using a combination of the two methods.

The information defined here are the exceptions per piping materials class to the default pipe bending elongation information defined on the *Pipe Bending Elongation* (on page 484) under the **Model Rules** node.

Bend Angle (Required)

Enter the bend angle for which the pipe bending elongation applies.

Nominal Piping Diameter (Required)

Enter the pipe diameter for which the flared pipe information applies.

Nominal Piping Diameter Units (Required)

Enter the unit of measurement, **in** or **mm** for example, for the value in the **Nominal Piping Diameter** column.

Pipe Bend Radius (Required)

Enter the pipe bend radius. Be sure to include the units of measurement when defining this value.

Pipe Elongation Unit Bend Angle (Required)

Enter the elongation of the plain piping due to the bending process per unit of bend angle. This value is the factor in th*e foll*owing equation: Elongation = Factor * Bend Angle.

Pipe Elongation (Required)

Enter the elongation value of the plain piping due to the bending process as an absolute value for a specific bend angle.

Spec Name (Required)

Type the name of the piping material class for which you are defining the pipe bending elongation information. The piping materials class that you enter must be defined on the *Piping Materials Classes* (on page 367).

Pipe Branch Fabrication Rule

The **Pipe Branch Fabrication Rule** node is an optional rule that defines the length of pipe stock required to fabricate a reinforcing pad saddle and the length of pipe stock required for an optional heavier schedule header pipe at the branch intersection for a reinforcing pad or a reinforcing weld. This additional length of pipe is considered in the pipe stock cut length calculation.

The pipe stock required for the branch reinforcement is determined by the following data.

Header Size (Required)

Specify the nominal piping diameter (NPD) of reinforced branch header.

Header Size Units (Required)

Define the system of units for the reinforced branch header size, such as **in** (inches).

Branch Size (Required)

Specify the nominal piping diameter (NPD) of reinforced branch.

Branch Size Units (Required)

Define the system of units for the reinforced branch size, such as **in** (inches).

Angle Low (Optional)

Specify the lower bound value of the acute branch angle required for the Branch Intersection rule. You can specify an angular tolerance of 45º or 90º about the nominal branch angle.

Angle High (Optional)

Specify the upper bound value of the acute branch angle required for the Branch Intersection rule. You can specify an angular tolerance of 45º or 90º about the nominal branch angle.

Branch Reinforcement Type (Required)

Define the branch reinforcement type for which additional pipe stock is to be reported.

Codelist value	Branch reinforcement type
5	Reinforcing pad, saddle
10	Reinforcing pad, saddle with heavier schedule header pipe
15	Reinforcing pad, full encirclement on header (not supported)
20	Reinforcing pad, full encirclement on header and branch (not supported)
25	Reinforced branch (not supported)
30	Reinforcing weld with heavier schedule header pipe

NOTE You can only modify the description of the branch reinforcement type. Do not edit the codelist numerical values

Saddle Fabrication Commodity Code (Conditionally required)

Specify a contractor commodity code value for the pipe stock. This commodity code value is used to fabricate a reinforcing pad saddle. If you do not specify a commodity code value for the reinforcing pad saddle, then the default pipe stock defined in the corresponding piping materials class is used.

NOTE A commodity code value is not required for a reinforcing weld.

Schedule Practice Saddle Fabrication (Conditionally required)

Specify a schedule practice, such as U.S. Practice and DIN, for the pipe stock used to fabricate a reinforcing pad saddle. This value is required if the schedule practice of the pipe stock is different from the default value defined in the corresponding piping material class.

NOTE This property represents a system-determined list of enumerated values. The administrator can revise the description of the schedule, but the value associated with that description and the number of schedule practices cannot be modified.

Schedule Thickness Saddle Fabrication (Conditionally required)

Specify the schedule thickness of the pipe stock used to fabricate a reinforcing pad saddle. This value is required only if the schedule thickness of the pipe stock is different from the default header pipe defined in the corresponding piping materials class.

Pipe Size Saddle Fabrication (Required)

Specify the nominal piping diameter of the pipe stock used to fabricate a reinforcing pad saddle.

Pipe Size Units Saddle Fabrication (Required)

Define the system of units for the pipe stock size used to fabricate a reinforcing pad saddle, such as **in** (inches).

Pipe Length Saddle Fabrication (Required)

Specify the length of the pipe stock used to fabricate a reinforcing pad saddle.

Commodity Code Heavy Schedule Header (Conditionally required)

Define a contractor commodity code value for the heavier schedule header pipe with a reinforced branch. If you do not specify a commodity code value for header pipe, then the default pipe stock defined in the corresponding piping materials class is used.

NOTE A commodity code value is not required for a reinforcing weld.

Schedule Thickness Heavy Schedule Header (Conditionally required)

Specify the schedule thickness of the pipe stock used to fabricate heavier schedule header pipe stock with a reinforced branch.

Pipe Size Heavy Schedule Header (Conditionally required)

Specify the nominal piping diameter of the heavier schedule header pipe with a reinforced branch. This value is required only if the size of the pipe stock used to fabricate the reinforcing pad saddle is different from the default header pipe defined in the corresponding piping materials class.

Pipe Size Units Heavy Schedule Header (Conditionally required)

Define the system of units for the pipe stock used to fabricate a heavier schedule header pipe with a reinforced branch, such as **in** (inches).

Pipe Length Heavy Schedule Header (Conditionally required)

Specify the length of the of the pipe stock used to fabricate a heavier schedule header pipe with a reinforced branch.

Commodity Code Reinforced Branch Run (Conditionally required)

Define a contractor commodity code value for the reinforced branch run. If you do not specify a commodity code value for the reinforced branch run, then the default pipe stock defined in the corresponding piping materials class is used.

Schedule Practice Reinforced Branch Run (Conditionally required)

Specify a schedule practice, such as U.S. Practice and DIN, for the pipe stock used to fabricate a reinforced branch run. This value is required, if the schedule of the pipe stock used to fabricate is different from the default value for that piping materials class.

NOTE This property represents a system-determined list of enumerated values. The administrator can revise the description of the schedule, but the value associated with the description and the number of schedule practices cannot be modified.

Schedule Thickness Reinforced Branch Run (Conditionally required)

Specify the schedule thickness of the pipe stock used to fabricate a reinforced branch run.

Pipe Size Reinforced Branch Run (Conditionally required)

Specify the nominal piping diameter of the reinforced branch run. This value is required only if the size of the reinforcing pad saddle is different from the default header pipe defined in the corresponding piping materials class.

Pipe Size Units Reinforced Branch Run (Conditionally required)

Define the system of units for the pipe stock size used to fabricate a reinforcing branch run, such as **in** (inches).

Pipe Length Reinforced Branch Run (Conditionally required)

Specify the length of the pipe stock used to fabricate a reinforced branch run.

Pipe Takedown Parts

The **Pipe Take Down Parts** rule specifies the short code that the **Insert Split** command uses for the takedown part or weld. Thus, for a given NPD, the software uses a flange pair, a union, or some other components that enable workers to disassemble a piping system.

Is Pair Required

Specifies if a pair of parts is required. For example, flanges are used in pairs so you would set this column to **Yes**. Unions are not used in pairs so you would set this column to **No**.

Is Weld

Select **Yes** if the split or takedown joint is welded. Select **No** if it is not.

NPD

Type the nominal pipe diameter for which you want to define the takedown or weld short code.

NPD Unit Type

Specify the units for the nominal pipe diameter value that you entered in the NPD column. For example, type **mm** or **in**.

Take Down Short Code

Type the short code to use if the user selects the **Takedown** option when using the **Insert Split** command.

Weld Short Code

Type the short code to use if the user selects the **Weld** option when using the **Insert Split** command.

See Also
Piping Materials Class Rules (on page 174)

Port Alignment Per Spec

The **Port Alignment Per Spec** rule under the **Piping Materials Class Rules** node defines:

- When a branch connects to a sloped header. Should the branch be trimmed by adding more weld material or by trimming the branch end?

- To provide flexibility in male/female mechanical connections such as underground bell and spigot.

- To trim the welded end of a flange at a nozzle to align with a sloped pipe.

 The port alignment rules defined on this sheet are the exceptions per piping materials class to the default port alignments defined on the *Port Alignment* (on page 486) under the **Model Rules** node.

Acceptable Alignment Tolerance (Required)

Specify the maximum angular variation between the branch centerline and the header centerline. Be sure to include the unit of measurement when defining this value, for example, **1.5deg**.

End Preparation (Required)

Type the end preparation code for the branch connection. Valid codes are listed in the **AllCodeLists.xls** workbook on the **EndPreparation** sheet in the **Codelist Number** column.

Method of Trimming (Required)

Enter the code for the method of trimming. Valid codes are listed in the **AllCodeLists.xls** workbook on the **MethodsOfTrimming** sheet in the **Codelist Number** column.

Nominal Piping Diameter From (Optional)

Enter the pipe diameter lower bound for which the port alignment applies.

Nominal Piping Diameter To (Optional)

Enter the pipe diameter upper bound for which the port alignment applies.

Nominal Piping Diameter Units (Optional)

Enter the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Spec Name (Required)

Specify the Piping Materials Class for which the port alignment exception is intended. You must define the Piping Material Class on the **PipingMaterialsClassData** sheet before you can use it on this sheet. For more information, see *Piping Materials Classes* (on page 367).

Preferred Cap Screw Length

The **Preferred Cap Screw Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Cap Screw Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

⊟ NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

Preferred Machine Bolt Length

The **Preferred Mach Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Machine Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Preferred Stud Bolt Length

The **Preferred Stud Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Stud Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

🗏 NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Preferred Tap End Stud Bolt Length Rule

The **Preferred Tap End Stud Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This rule contains all the default values that the software is to use.

This rule is used when the **Tap End Stud Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred tap end stud bolt lengths".

🗐 NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Reinforcing Pad Data

The **Reinforcing Pad Data** node defines the minimum reinforcing pad width to use in branch reinforcement calculations based on the header and branch size and the acute angle of the intersection between the header and the branch.

Acute Branch Angle From (Required)

> Enter the branch angle lower bound for which the reinforcing pad data applies. Be sure to include the unit of measurement when specifying this value.

Acute Branch Angle To (Required)

> Enter the branch angle upper bound for which the reinforcing pad data applies. Be sure to include the unit of measurement when specifying this value.

Branch Size (Required)

> Enter the branch size for which the reinforcing pad data applies.

Branch Size Units of Measure (Required)

> Specify the units of measurement, **in** or **mm** for example, of the value you entered in the **Branch Size** column.

Header Size (Required)

> Enter the header size for which the reinforcing pad data applies.

Header Size Units of Measure (Required)

> Specify the units of measurement, **in** or **mm** for example, of the value you entered in the **Header Size** column.

Minimum Reinforcing Pad Width (Required)

> Enter the minimum width of the reinforcing pad. Be sure to include the units of measurement, **in** or **mm** for example, when specifying this value.

See Also

Reinforcing Weld Data

The **Reinforcing Weld Data** node defines the minimum reinforcing weld size to use in branch reinforcement calculations based on the header and branch size and the acute angle of the intersection between the header and the branch. This data is currently not used by the software.

Acute Branch Angle From (Required)

Enter the branch angle lower bound for which the reinforcing pad data applies. Be sure to include the unit of measurement when specifying this value.

Acute Branch Angle To (Required)

Enter the branch angle upper bound for which the reinforcing pad data applies. Be sure to include the unit of measurement when specifying this value.

Branch Size (Required)

Enter the branch size for which the reinforcing weld data applies.

Branch Size Units of Measure (Required)

Specify the units of measurement, **in** or **mm** for example, of the value you entered in the **Branch Size** column.

Header Size (Required)

Enter the header size for which the reinforcing weld data applies.

Header Size Units of Measure (Required)

Specify the units of measurement, **in** or **mm** for example, of the value you entered in the **Header Size** column.

Minimum Reinforcing Weld Size (Required)

Enter the minimum weld size of the reinforcing weld. Be sure to include the units of measurement, **in** or **mm** for example, when specifying this value.

See Also

Root Gap Per Spec

The **Root Gap Per Spec** rule node is an optional rule that defines the root gap to apply to the weld between the header pipe and an olet-type branch, or between an elbow and an elbolet. The information defined in this node is the exceptions per piping materials class to the root gap information defined on the *Root Gap Rule* (on page 491).

Nominal Piping Diameter From (Optional)

Define the lower bound of the header's largest nominal piping diameter for which this root gap applies.

Nominal Piping Diameter To (Optional)

Define the upper bound of the header's largest nominal piping diameter for which this root gap applies.

Nominal Piping Diameter Units (Optional)

Specify the units for the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Root Gap (Required)

Specify the root gap to use for the nominal piping diameter range. Be sure to include the units of measure when specifying this value.

See Also
Piping Materials Class Rules (on page 174)

Service Limits

The **Service Limits Rule** node specifies the temperature and the corresponding pressure that define the boundaries of acceptability for a piping materials class.

⭐ **IMPORTANT**

- By entering service limit values for a piping materials class, the software will force users who route pipe to enter temperature and pressure information for the pipe run. Only by forcing users to enter temperature and pressure information can the software comply with the service limits that you defined here.

- The software does not prevent you from defining testing pressures and temperatures that exceed the service limit pressure and temperature defined here.

Nominal Piping Diameter From (Optional)

Define the lower bound nominal piping diameter for which this service limit applies.

Nominal Piping Diameter To (Optional)

Define the upper bound nominal piping diameter for which this service limit applies.

Nominal Piping Diameter Units (Optional)

Specify the units for the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Pressure (Required)

Enter the pressure service limit. Include the unit of measure, **psi** or **kPa** for example, when defining this value.

Temperature (Required)

Enter the temperature service limit. Include the unit of measure, **F** or **K** for example, when defining this value.

See Also
Piping Materials Class Rules (on page 174)

Size Reduction Per Spec

The **Size Reduction Rule Per Spec** is an optional rule that defines the permissible size reductions for both concentric and eccentric reducers. For example, you might define rules that a 8"X4" size reduction is to use a single 8"X4" reducer, while a 6"X2" size reduction is to use a 6"X4" reducer and a 4"X2" reducer. You can also specify your preference for a size reduction when more than one solution is available. The information defined on this sheet is the exceptions per piping materials class to the size reduction information defined on the *Size Reduction Rule* (on page 493).

First Size (Required)

Enter the first size of the size reduction to define.

First Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **First Size** column.

Fitting 2 First Size (Required)

Enter the first size for the second reduction fitting.

Fitting 2 First Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 2 First Size** column.

Fitting 3 First Size (Optional)

Enter the first size for the third reduction fitting.

Fitting 3 First Size Units (Optional)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 3 First Size** column.

Fitting 4 First Size (Optional)

Enter the first size for the four reduction fitting.

Fitting 4 First Size Units (Optional)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 4 First Size** column.

Second Size (Required)

Enter the second size of the size reduction to define.

Second Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **Second Size** column.

Size Reduction Type (Required)

Enter a **1** if the size reduction rule you are defining is for concentric reducers. Enter a **2** if the size reduction rule is for eccentric reducers.

Size Reduction Preference (Optional)

Enter a number between 1 and 4 to indicate your solution preference order when more than one size reduction solution is defined. For example, a 24"x6" reduction can be done using a 24"x14" and a 14"x6", using a 24"x12" and a 12"x6", or using a 24"x10" and a 10"x6". Enter **1** as the default preference, enter **2** for your second choice, and so on.

See Also
Piping Materials Class Rules (on page 174)

Stud Bolt Length Calculation Tolerance

The **Stud Bolt Length Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the stud bolt length. This sheet contains all the default values that the software is to use.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance on the bolt length for the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

See Also

Tap End Stud Bolt Calculation Tolerance Rule

The **Tap End Stud Bolt Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the tap end stud bolt length. This rule contains all the default values that the software is to use.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance on the bolt length for the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

See Also
Bolt Length Calculations (on page 308)
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)
Bolt Selection Filter for Nozzles (on page 462)
Machine Bolt Length Calculation Tolerance (on page 403)
Preferred Machine Bolt Length (on page 414)
Preferred Stud Bolt Length (on page 415)
Stud Bolt Length Calculation Tolerance (on page 421)

Thickness Data Rule

The **Thickness Data Rule** node defines the thickness values required for the calculation of piping wall thickness.

Minimum Thickness (Required)

Type the minimum acceptable thickness, inclusive of corrosion allowance, thread tolerance, and mill tolerance, that you want to use in wall thickness calculations for the specified nominal piping diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Nominal Piping Diameter (Required)

Type the nominal pipe diameter to which the thickness data applies.

Nominal Piping Diameter Units (Required)

Specify the units for the nominal pipe diameter value that you entered in the **Nominal Piping Diameter** column. For example, type **mm** or **in**.

PreferredSchedule1 (Required)

Enter the first permissible schedule or wall thickness that you want to use for this piping materials class. If the schedule short description in the **ScheduleThickness Short Description** column in AllCodeLists.xls > ScheduleThickness sheet includes units of measurement then you must also type the units of measurement, such as **mm** or **in**.

NOTE You can specify up to six preferred schedules or thicknesses for the piping materials class. However, the schedules or wall thicknesses must be listed in ascending order of thickness. In other words, the first preferred schedule or wall thickness value must be the smallest, the last preferred schedule or wall thickness value must be the largest, and the intermediate values must increase in thickness.

PreferredSchedule2 (Optional)

Enter the second permissible schedule code or wall thickness that you want to use for this piping materials class.

PreferredSchedule3 (Optional)

Enter the third permissible schedule code or wall thickness that you want to use for this piping materials class.

PreferredSchedule4 (Optional)

Enter the fourth permissible schedule code or wall thickness that you want to use for this piping materials class.

PreferredSchedule5 (Optional)

Enter the fifth permissible schedule code or wall thickness that you want to use for this piping materials class.

PreferredSchedule6 (Optional)

Enter the sixth permissible schedule code or wall thickness that you want to use for this piping materials class.

Retirement Thickness (Required)

Type the minimum acceptable thickness; exclusive of corrosion allowance, thread tolerance, and mill tolerance; that you want to use in wall thickness calculations for the specified nominal piping diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Thread Thickness (Required)

Type the thread thickness that you want to use in wall thickness calculations for threaded pipe. The thread thickness is added to the calculated wall thickness to account for the presence of threads. Be sure to include the units, for example, **0.5in** or **1.375in**.

See Also
Piping Materials Class Rules

Weld Clearance Rule

The **Weld Clearance Rule** node specifies interference clearances at each field weld location. By defining a clearance, you can detect if a weld is too close to another object, such as another pipe or a building wall, to permit the use of automatic welding machines or to allow for proper inspection.

The weld clearance data is determined by the piping materials class, the nominal piping diameter (a range), and the Weld Class, that is the determination of "By Pipe Erector" versus "By Pipe Fabricator" welds.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this weld clearance applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this weld clearance applies.

Nominal Piping Diameter Units (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Weld Class (Required)

Type the weld class code.

Weld Clearance Length (Required)

Type the length of the cylindrical reserved space along the pipe and centered at the weld. For example, if you enter 36 inches here, you are reserving 18 inches on either side of the center of the weld for clearance.

Weld Clearance Radius Increase (Required)

Type the radius of the cylindrical reserved space around the pipe. This value is in addition to the pipe radius.

See Also
Piping Materials Class Rules (on page 174)
Field Fit Length (on page 398)
Reinforcing Weld Data (on page 418)
Weld Clearance Rule (on page 424)
Weld Gap Rule (on page 425)
Weld Model Representation Rule (on page 499)
Weld Type Rule (on page 500)

Weld Gap Rule

The **Weld Gap Rule** node specifies the space between male welded ends of a welded joint when space is required by the welding process. The weld gap is used to compute the piping cut lengths and to provide accurate modeling of fitting-to-fitting pipe spools.

Nominal Diameter From (Optional)

Define the lower bound of the largest nominal piping diameter for which this weld gap applies.

Nominal Diameter To (Optional)

Define the upper bound of the largest nominal piping diameter for which this weld gap applies.

Nominal Piping Diameter Units (Optional)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Weld Gap (Required)

Type the gap between the welded ends of the welded joint. Be sure to include the units when defining this value, for example, **3mm**.

Weld Type (Required)

Enter the weld type code.

See Also
Piping Materials Class Rules (on page 174)
Field Fit Length (on page 398)
Reinforcing Weld Data (on page 418)
Weld Clearance Rule (on page 424)
Weld Gap Rule (on page 425)
Weld Model Representation Rule (on page 499)
Weld Type Rule (on page 500)

Washer Selection Filter

The **Washer Selection Filter** node defines selection rules for the washers used for bolted joints in the model. You must ensure that the correct material grade is selected to match the recommended bolting temperature and stress ranges. The software passes the piping specification name and the bolt diameter into this selection filter to retrieve the washer commodity code.

Bolt Diameter (Required)

Specify the diameter of the bolt including the unit indicator. For example, type **0.5 in** or **2 in**.

Comments (Optional)

Specify an optional brief description of the commodity code.

Contractor Commodity Code (Required)

Type the contractor commodity code, which identifies the washer that you want to use from the *Washer Part Data Sheet* (on page 314).

Fabrication Category Override (Optional)

Type the fabrication code.

Maximum Temperature (Conditionally Required)

Specify the maximum temperature the washer is intended for in this piping material class. You must specify the maximum temperature if the washer is not intended for the full temperature range of the corresponding piping material class.

Piping Note 1 (Optional)

Specify the Standard Notes that you want to associate with the filter. Standard notes are defined in the Piping > Piping Specification > Notes node.

Pressure Rating (Optional)

Define the pressure rating for the bolted joint. The software assumes that the washer selection will not vary when the pressure rating values for the two bolted ends are different but the drilling templates are still compatible (for example, Class 125 and Class 150). Therefore, only one pressure rating value is required for washer selection.

Rating Practice (Optional)

Select the pressure rating practice for the washer selection.

Supply Responsibility Override (Optional)

Type the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

Supplementary Washer Requirement (Optional)

Select whether a second supplementary washer is required for each machine bolt or each end of each stud bolt.

Supplementary Washer Contractor Commodity Code (Optional)

Type the contractor commodity code, which identifies the supplementary washer that you want to use from the *Washer Part Data Sheet* (on page 314).

Washer Option (Conditionally Required)

Type the washer option code to use when the piping designer does not select a washer type.

See Also

Piping Materials Class Rules (on page 174)
Washer Part Data Sheet (on page 314)
Washer Selection Filter (on page 425)

Piping Specialty Class Data

The **Piping Specialty Class Data** node defines the piping specialty class data. This data is based on size range and does not vary per piping materials class.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity.

Bolting Requirements (Optional)

Select the bolting requirement for the piping commodity. The following options are available:

- **Undefined** - The bolting requirement is undefined.

- **Bolting required** - The piping commodity requires a reportable set of bolts determined by the bolted joint, but based on a special bolt extension option. If you select this option, you must define the **Bolt Extension Option**.

- **Complete substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of threaded holes to match the drilling template applicable to the mating flange.

- **Complete substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of the bolted joint. Cap screws (or tap end stud bolts) are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of tapped holes to match the drilling template applicable to the mating flange.

- **Partial substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for threaded holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of threaded holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are threaded.

- **Partial substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of tapped holes with

respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are tapped.

- **Bolts supplied with nozzle and not to be reported** - The piping commodity is supplied with the necessary bolts included, such that the applicable bolts should not be reported.

- **Reportable bolts not required** - A set of bolts is not applicable to any end of this piping commodity because all ends are non-bolted. This option is the default for any piping commodity without any bolted ends.

- **Complete substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of threaded holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Complete substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of tapped holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Partial substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This option represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a partial set of threaded holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of the reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are threaded. This option is not available for nozzles.

- **Partial substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This will address the situation where the smaller end of a reducing flange includes a partial set of tapped holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of a reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are tapped. This option is not available for nozzles.

- **Complete cap screw substitution for full threaded and tapped holes for each bolted end** - Each bolted end requires a reportable set of substitution cap screws for full threaded holes and also tapped holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation. In other words, this represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the through-bolted fitting includes a complete set of threaded holes and also tapped holes to match the drilling template applicable to the companion flange. This can be required, as an example, for a larger size asymmetrical lug body butterfly valve where tapped holes are required near the valve stem. This option is not available for nozzles.

NOTES

- Any through-bolted joint, where the Termination Subclass for one of the bolted ends indicates through-bolted end with bolt holes, but the Bolting Requirement property for the fitting at that same bolted end indicates a complete substitution of cap screws (or tap end stud bolts), the software considers it to be a bolted joint, not a through-bolted joint.

- Although two or more through-bolted fittings may be involved in forming a through-bolted connection, the software assumes that only one through-bolted fitting exists for any situation where either complete substitution or partial substitution with cap screws (or tap end stud bolts) applies. Furthermore, whenever two or more through-bolted fittings form a through-bolted connection, the software assumes that the bolts extend through all of the through-bolted fittings.

Cap Screw Engagement Gap (Conditionally Required)

Specify the total gap between the cap screw ends inserted into each threaded hole end. The engagement gap is used in the bolt length calculations for cap screws in threaded holes. Use this field when an engagement gap that is unique to a component is needed.

This engagement gap value is used for all cap screw diameters regardless of the cap screw diameter or the nominal piping diameter for the valve, or fitting, requiring the cap screws. If you do not specify a value here, then the default value for the piping specification is used.

Clamp Requirement (Conditionally Required)

Select whether or not the commodity requires a clamp if one or more mechanical ends apply. This option overrides the clamp query in the clamp selection filter when the value of the Termination Subclass is set to "Mechanical joint with clamp" or "Mechanical joint with clamp and hub or ferrule".

Contractor Commodity Code (Conditionally Required)

Enter the contractor commodity code, which is the commodity code that is used during the design phase.

NOTE The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size- independent or size-dependent. One cannot be size-dependent and the other one be size-independent. In addition, both must include a schedule or neither must include a schedule.

Corrosion Allowance (Optional)

Specify the corrosion allowance for the piping specialty item. This value is used in the calculation of the wall thickness. Include the units of measurement, **in** or **mm** for example, when specifying this value.

Fabrication Type (Conditionally Required)

Type the fabrication code.

First Size From (Required)

Defines the lower bound of the largest nominal piping diameter for which this piping specialty item applies.

First Size Schedule (Conditionally Required)

Enter the short description that represents the schedule (or thickness) for the first size end of this piping specialty item. This data is required only when the commodity code does not include schedule.

First Size To (Required)

Defines the upper bound of the largest nominal piping diameters for which this piping specialty item applies.

First Size Units (Required)

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

First Size UOM Basis In Catalog (Conditionally Required)

Enter the units of measure basis code.

Gasket Requirements (Conditionally Required)

Enter the code that represents the piping specialty item gasket requirements.

Generic Tag Number (Conditionally Required)

Enter a generic tag number for the piping specialty item. A generic tag number is used for "off the shelf" specialty items.

Geometric Industry Standard (Required)

Enter the code that represents the source used in the preparation of the catalog data applicable to the piping specialty item.

Geometry Type

Type the geometry type code.

Hyperlink To Electronic Vendor (Optional)

Type the URL address to the electronic vendor catalog.

Is Graphical Representation

Specify whether the piping specialty item appears in the model.

Lining Material (Optional)

Type the code that defines the lining material, if any, for the piping specialty item. Examples of lining material include epoxy, rubber, and plastic.

Localized Short Material Description (Optional)

Type a description for the material. The software uses this description in the bill-of- materials part of isometric drawings when construction personnel require a different language than what was used in the **Short Material Description** box.

Long Material Description (Optional)

Type a description for the material to use when requisitioning.

Loose Material Requirements (Conditionally Required)

Enter the code that represents the loose material requirements for the piping specialty item.

Manufacturer (Optional)

Enter the code that represents the manufacturer of the piping specialty item. This property is optional, but can be used to track the manufacturer for reporting.

Material Grade (Optional)

Enter the material grade code for the piping specialty item.

Maximum Pressure (Optional)

Enter the maximum pressure for which this piping specialty item is intended. Include the units for measure, **psi** for example, when specifying this value.

Maximum Temperature (Optional)

Enter the maximum temperature for which this piping specialty item is intended. Include the units of measure, **F** or **C** for example, when specifying this value.

Mirror Behavior Option (Conditionally Required)

Define the mirror behavior for the piping specialty item.

Multisize Option (Conditionally Required)

Type a string to represent an optional piping specialty item selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column is used.

NOTE You can append the keywords **Primary** (primary size) and **Secondary** (secondary size) to the column headings for the nominal piping diameters at each end in the workbook for the part data to assign the size to a specific piping point instead of using the **Multisize Option** property. Fittings that require two sizes will be assumed to have the primary size assigned to the first piping point and the secondary size assigned to the second piping point. Multi-size fittings with three or more sizes must have the sizes assigned to the appropriate piping points by means of the multi-size option property. Fittings with exactly two sizes and three or more piping points may have the size assigned to the appropriate piping point by using these keywords.

Part Data Basis (Conditionally Required)

Enter the code that represents the basis of the dimensional data defined in the piping specialty part data. Set this value to recognize those components that require special treatment in terms of interpreting the symbol dimensional data. For example, the valve symbol is designed on the basis of a face-to-face dimension. However, the manufacturer provides the face-to-center dimension. The symbol can be designed to react accordingly on the basis of the value of this property.

Quantity of Alt Reportable Parts (Optional)

Enter the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts (Optional)

Type the number of objects to be reported per instance of the piping specialty item. This value must be an integer.

Piping Note 1 (Optional)

Specify the standard notes that you want to associated with the specialty. Standard notes are defined in the Piping > Piping Specification > Notes node.

Reportable Commodity Code (Optional)

Type the commodity code of the piping specialty item that you want created with the primary commodity code item. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here.

Reporting Type (Conditionally Required)

Type the reporting requirements code for the piping specialty item. You can specify that the commodity is reported or not reported. An example of a piping specialty item that you may not want reported is a spacer for a valve. You have to order the valve, but the spacer comes with the valve and does not need to be ordered.

Requisition Type (Required)

Type the requisition type code. If you set this option to "Stock with validation", then the software uses the commodity specific service limits that are define in *Piping Commodity Service Limits* (on page 340).

Second Size From (Conditionally Required)

Defines the lower bound of the next largest nominal piping diameter for which this piping specialty item applies.

Second Size To (Conditionally Required)

Defines the upper bound of the next largest nominal piping diameters for which this piping specialty item applies.

Second Size Schedule (Conditionally Required)

Enter the short description that represents the schedule (or thickness) for the second size end of this piping specialty item. This data is required only when the commodity code does not include schedule.

Second Size Units (Conditionally Required)

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Second Size UOM Basis In Catalog (Conditionally Required)

Enter the units of measure basis code.

Short Material Description (Required)

Type a description for the material. The software uses this description in the bill-of-materials part of isometric drawings, for reporting, and for visual feedback to the piping designer for design, construction, and fabrication.

Spec Name

Specify the piping materials class name.

Specialty Type (Conditionally Required)

Enter the commodity type codelist number.

Subst Cap Screw Contractor Commodity Code (Conditionally Required)

Type the contractor commodity code for the replacement cap screws.

Subst Cap Screw Diameter (Conditionally Required)

Type the diameter of the cap screw including the units. For example, type **0.5in** or **1in**.

Subst Cap Screw Quantity (Conditionally Required)

Type the number of machine bolts or studs that are being replaced by cap screws at each bolted end of the piping specialty item.

For non-through bolted fittings, the number of cap screws to substitute for machine bolts or studs required by the drilling template is the same as the number of machine bolts or studs being replaced.

For through bolted fittings with threaded holes, the number of cap screws required is twice the number of machine bolts or studs being replaced.

This value is not required when all bolts defined by the drilling template are replaced by cap screws.

Supply Responsibility (Optional)

Enter the code that represents the person responsible for supplying the item.

Tag Number (Conditionally Required)

Enter a specific tag number for the piping specialty item. You can also specify a generic tag number here. Tag number is used for specific, one-of-a-kind specialty items.

Tapped Hole Depth (Conditionally Required)

Type the depth of the tapped hole in the valve or fitting that requires substitution cap screws, including the unit. This value is not required for substitution cap screws at threaded holes.

Tapped Hole Depth 2 (Conditionally Required)

Type the depth of the tapped hole at port two of an asymmetrical valve or fitting that requires substitution cap screws (or substitution tap end stud bolts), if applicable. For example, a lug body butterfly valve requires different length cap screws on the basis of the applicable end of the valve.

This value is used to compute the length of the cap screw. If a value has not been specified here, then the value of **Tapped Hole Depth** is used in the bolt length calculations. This value is not required for substitution cap screws at threaded holes or when the value of **Bolt Type** in the bolt part data indicates that the cap screw is actually a machine bolt.

Vendor (Optional)

Enter the code that represents the vendor that is supplying the piping specialty item. This property is optional, but can be used to track the vendor for reporting.

Valve Operator Catalog Part Number (Conditionally Required)

Type the unique identification for the valve operator as found in the catalog data and the material control data.

Valve Operator Geometric Ind Std (Optional)

Enter the code that represents the source used in the preparation of the catalog data applicable to the valve operator.

Valve Operator Type (Conditionally Required)

Enter the code that represents the specific type of valve operator, actuator, or appurtenance.

Welding Requirements (Conditionally Required)

Enter the code that represents the welding requirements for the piping specialty item.

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Materials Classes (on page 367)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Model Options

You use the **Model Options** node in the Catalog tree view to define several overall rules for piping specifications.

NOTE The **Model Options** node in the **Catalog** task defines the same rules as does the **Default Project Options** sheet in the **Piping Specification.xls** workbook. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide*, available with the **Help > Printable Guides** command in the software.

Automated Branch Data Creation Option

Enables or disables the automated creation of the branch data in the piping commodity filter on the basis of the branch intersection rule for the corresponding piping materials class. If you enable this option, the software creates entries in the piping commodity filter for the "by system" branch fittings. The software automatically assigns values for the following properties:

Short code
First size, from
First size, to
Second size, from
Second size, to
Commodity option
Option category

Selection basis
Jacketed piping basis

Automated Industry Commodity Code Creation Option

Enables or disables the automated creation of industry commodity codes.

Bolt Commodity Code Expansion Substitution Option

Enables the Bolt Commodity Code Substitution rule, enables the Bolt Commodity Code Expansion rule, or specifies that the bolt commodity code is not affected by the bolt length or diameter.

If you consider the bolt's commodity code to be independent of the bolt length and diameter by embedding the bolt length and diameter in the material description, you should select that the bolt commodity code is not affected by the bolt length or diameter.

If you select to enable the Bolt Commodity Code Substitution rule, you need to define entries in the *Bolt Commodity Code Substitution Rule* (on page 457).

Bolt Diameter Equivalence Option

Specifies whether the bolt diameter equivalence rule for reporting the bolt diameter is enabled or disabled. If you do not specify a value, the default is to disable the rule. For example, enable this option when you are required to use ASME fittings in a metric model, but also use real metric bolts.

When this option is enabled, the actual bolt equivalence values are defined in the optional **Bolt Diameter Equivalence.xls** workbook on the **BoltDiameterEquivalenceRule** sheet. For more information, see the *Piping Reference Data Guide.*

Bolt Length Calculation Option

Enables or disables the calculation of bolt lengths. If disabled, bolt length is not calculated. If enabled, the bolt lengths from the **Bolt Extension Rule** are used. For more information, see *Bolt Extension* (on page 458).

Cap Screw Engagement Gap

Specifies a setback constant for the cap screw length to avoid having the cap screw bottom out in the hole. The software calculates the length of the cap screw as the depth of the hole minus the value defined here. The **Cap Screw Length Round Off Option** must be set to "Use Value" in order to use this value.

Cap Screw Length Round Off Option

Specifies the method to use for rounding cap screw bolt length calculations. If this option is set to "Use Value", then the round off value that you specify in **Cap Screw Length Round Off Value** is used. If this option is set to "Use list of preferred bolt lengths", then the values that you have defined in *Preferred Cap Screw Length* (on page 413) are used.

Cap Screw Length Round Off Value

Specifies the length round off value to use in length calculations. The **Cap Screw Length Round Off Option** must be set to "Use Value" in order to use this value. The computed bolt length is rounded down to the next increment of the value defined here. For example, if you enter 0.25in here and the calculated bolt length is 3.05in, the bolt length is rounded down to 3.00in. There is a 0.0001 inch tolerance applied to the computed length. Therefore, a cap screw with a computed length of 2.74999 inches is reported as 2.75 rather than 2.50.

Commodity Code Dependence on Schedule

Specifies whether the contractor commodity code in the piping commodity filter is dependent upon schedule when editing piping specs. In other words, this option determines whether it is necessary to define values for the First Size Schedule and the Second Size Schedule properties in the piping commodity filter. You can select:

- Contractor commodity code includes schedule

- Contractor commodity code does not include schedule

NOTE It is assumed that both the Contractor Commodity Code and the Industry Commodity Code are based on Schedule, or neither is based on Schedule.

Default Industry Practice

Specifies the default Industry Practice to use when editing piping specifications and pipe part data.

Default Pipe Bending Machine Number

Specifies the default pipe bending machine number. You define the available pipe bending machines in the Piping\Pipe Bending Data\Pipe Bending Machine Data node. For more information, see *Pipe Bending Machine Data* (on page 333).

Density of Water

Specifies the density of water for which the water weight data in the piping catalog applies.

Description

Specifies a description of the piping specification.

Eccentric Offset Basis Option

Select whether to compute the eccentric offset of eccentric fittings based on the piping inside diameter or the piping outside diameter when the schedules of the two ends are different. The default is based on the outside diameter.

Gasket Selection Based on Fluid Code

Specifies the basis on which the fluid code is to be used to select gaskets when the gasket selection filter is based on the operating fluid. This option applies to all piping materials classes within the piping specification where the fluid code is used as selection criteria for gaskets. You can select:

- **Fluid Code used to select all gaskets** - Specify this option if the fluid code must be specified for all gaskets in the gasket selection filter when the gasket selection filter is based on the operating fluid. If the fluid code is used as the selection criteria for the default gasket within a piping spec for a specific size range and a specific type of bolted joint, then the fluid code must be specified for each acceptable gasket in the applicable piping spec for the applicable size range and the applicable type of bolted joint. For more information, see *Gasket Selection Filter* (on page 381).

- **Fluid Code used to select gasket exceptions** - Specify this option if it is necessary to specify the fluid code only for the gasket exceptions in the gasket selection filter when the gasket selection filter is based on the operating fluid.

- If fluid code has been specified in the gasket selection filter, then the query for the gasket to be used at the bolted joint is based on the fluid code. If the query does not find a gasket by querying with fluid code, then the fluid code is ignored and the gasket selection filter is queried for gaskets where the fluid code has an undefined value. In

other words, you define the special cases with a value for the fluid code in the gasket selection filter but all other fluid code values result in the "default" gasket being selected because the fluid code has not been specified. This ability addresses a situation, where a piping spec is applicable to 15-20 different values of Fluid Code. Most of the Fluid Code values applicable to this piping spec use the default gasket. However, a few Fluid Code values require special gaskets.

Gasket Selection for Mismatched Bolted Ends

Specifies how the software selects gaskets for joints formed by different bolted ends (different pressure rating, end preparation, or end standard) but that are based on equivalent drilling templates.

Select **Gasket selection based on both bolted ends is required** to select the gasket based on the nominal piping diameter, pressure rating, end preparation, and end standard of both bolted ends. This provides the flexibility to specify the gasket to be used when the default gasket normally used with one of the bolted ends differs from the default gasket normally used for the other bolted end. In this situation, an error is reported if the gasket has only been defined in the gasket selection filter on the basis of one of the two bolted ends.

Select **Gasket selection based on an arbitrary bolted end is acceptable** to arbitrarily select the gasket based on only one of the two bolted ends when you have not defined the gasket on the basis of both bolted ends. If you choose this option, you assume responsibility that the gasket selected is acceptable. This approach reduces the number of required gasket records for a piping materials class with a number of unique, but compatible, bolted ends, where the piping engineer's intent is to reduce the material handling costs by reducing the number of gaskets maintained in inventory. Note that, if you do specify a gasket based on both of the applicable bolted ends, the correct gasket is selected rather than another gasket based on an arbitrary bolted end. This is the default setting.

📝 **NOTE** Smart 3D only uses the **Gasket Selection for Mismatched Bolted Ends** value when **Automated Gasket Selection at Spec Break** is not defined. For more information, see *Automated Gasket Selection at Spec Break Rule* (on page 452).

Header Branch Size Basis Option

Specifies whether the values of Header Size and Branch for the Branch Intersection Rule are determined automatically based on the size ranges for the pipe stock and branch nipples in the piping commodity filter, or if they are determined based on the sizes in the Permissible Nominal Piping Diameters Rule for the applicable piping materials class. This option only applies to the editing of piping specs. You can select:

- Based on pipe stock and branch nipples in piping commodity filter
- Based on Permissible Nominal Piping Diameters Rule

Hyperlink to Human Spec

Specify the location of the electronic version of the human piping specification. You can specify the location using the http:// protocol or by using a Universal Resource Location (URL) address (for example, \\server\share). Define this option when you have created a single electronic document for all piping materials classes within the piping specification.

Industry Commodity Code Option

Specifies whether you want to use the industry commodity code, the contractor commodity code, or the client commodity code to select parts from the piping catalog.

Machine Bolt Length Round Off Option

Specifies the method to use for rounding machine bolt length calculations. If this option is set to "Use Value", then the round off value that you specify in **Machine Bolt Length Round Off Value** is used. If this option is set to "Use list of preferred bolt lengths", then the values that you have defined in *Preferred Machine Bolt Length* (on page 414) are used.

Machine Bolt Length Round Off Value

Specifies the length round off value to use in length calculations. The **Machine Bolt Length Round Off Option** must be set to "Use Value" in order to use this value. The computed bolt length is rounded up to the next increment of the value defined here. For example, if you enter 0.25in here and the calculated bolt length is 3.05in, the bolt length is rounded up to 3.25in.

Minimum Plate Flange Thickness

Specifies the minimum plate flange thickness that requires an extra weld at the face of flange. Be sure to include the units (in or mm) when defining this value.

Name

Specifies a name for the piping specification.

Non-Radial Offset Branch Outside Diameter Multiplier

Type the multiplier for the piping header outside diameter to be used to determine the protrusion of the branch pipe into the header pipe when the non-radial branch is offset from the header centerline, but not tangential. Typically, the protrusion of the branch into the header is 0.375 x the header outside diameter for an offset, non-radial branch.

Non-Radial Tangent Branch Outside Diameter Multiplier

Type the multiplier for the piping header outside diameter to be used to determine the protrusion of the branch pipe into the header pipe when the non-radial branch is tangential with respect to the header pipe. Typically, the protrusion of the branch into the header is 0.5 x the header outside diameter for a tangential, non-radial branch.

Nut Creation Option

Specifies whether you want nuts automatically created at bolted joints. Disable this option when nuts are not tracked by material management. Even with this option disabled, you can still use the nut height for the bolt length calculation if the nut selection filter and accompanying nut part data are defined in the catalog.

📄 **NOTE** You can create nuts in the model but not have them reported by setting the **ReportingType** column on the **PipingCommodityMatlControlData** sheet for the nut.

Olet-Branch Ownership Option

Specifies whether you want olet-type branches owned by the header run or owned by the branch run for reporting and extracting isometric drawings purposes. You can also set this to undefined.

Pipe Bend Radius By User Option

Enables or disables the ability of the piping designer to override the pipe bend radius defined in the piping specification. The ability may be needed to allow the piping designer to route pipe around the circumference of a tank such that the pipe remains a constant distance from the surface of the tank.

Pipe Bend Radius Multiplier Option

Specifies how the absolute bend radius value is obtained. You can specify that it is the product of the nominal piping diameter (or optionally the outside diameter) times the pipe bend radius multiplier, or is a rule based on the nominal piping diameter and the pipe bend radius multiplier as defined on the *Pipe Bend Radius Multiplier Rule* (on page 408). For more information, see *Piping Commodity Filter* (on page 385).

Pipe Spec Version Management Option

Enables or disables the version management of piping specifications. If enabled, the software keeps the different revisions of a piping specification so that piping designers can select the revision that they need. We recommend that before you enable this option, you make sure that the **Revision Number** column in the piping specifications   has the initial revision text defined. After you have enabled the option, you will need to go to the **Systems and Specifications** task and re-define the allowable specifications. An example workbook named "Sample Data for Versionable Pipe Specs.xls" is delivered in the SampleDataFiles folder.

Piping Commodity Catalog Part Number Basis Option

Specifies the code to use. This option allows you to enable the use of the size-dependent commodity code as the piping commodity catalog part number in lieu of concatenating the piping commodity catalog part number from the industry commodity code and the nominal piping diameter for each of the piping points.

If you have a size-dependent commodity numbering system such that the size is already appended as a prefix or suffix to the commodity code base, then you may prefer to use the commodity code base and size ranges in the piping specification, but use the size-dependent commodity code in the piping catalog. Note that the size-dependent contractor commodity code from the piping commodity filter must be the same as the size-dependent contractor commodity code from the piping commodity material control data.

If you select the "Use the size-dependent client commodity code from the piping commodity procurement data" option, you need to define data in the Piping Commodity Procurement node. For more information, see *Piping Commodity Procurement* (on page 363).

Piping Commodity Override Option

Specifies whether piping designers can override the piping specification by selecting a piping commodity directly from the piping catalog. This option is the default setting for all piping material classes that you define. You can override this setting for an individual piping material class by using the **Piping Commodity Override Option** setting on the **PipingMaterialClassData** sheet for that piping material class.

Piping Commodity Procurement Data Option

Specifies whether the contractor commodity code or the industry commodity code is to be used to query the piping commodity procurement data:

- Not applicable
- Determine procurement data based on contractor commodity code
- Determine procurement data based on industry commodity code

If you do not specify a value, the not applicable option is used by default. For more information, see *Piping Commodity Procurement* (on page 363).

Piping Specification Commodity Code Builder

Activates the commodity code builder for Industry Commodity Codes, Contractor Commodity Codes, Both Contractor and Industry Commodity Codes, or disables the commodity code builder. You can also set this option in the Catalog task by going to **Tools > Options**, selecting the **Piping Specifications** tab, and then use the **Provide tools for building and selecting code for:** option.

If this option is enabled, the software activates the Commodity Code Builder when creating or revising commodity code properties in either the piping specification or the piping catalog. For more information, see *Select Commodity Code Dialog Box* (on page 141).

This option also enables the automated creation of the Industry Commodity Code in the piping commodity class data on the basis of property values and customizable formats, as specified. Refer to *Appendix: Industry Commodity Code* (on page 847) for a description of the automated creation of industry commodity codes. The value for the Industry Commodity Code in the piping commodity class data is formed automatically whenever this option is enabled for the Industry Commodity Code or enabled for both the Industry Commodity Code and the Contractor Commodity Code. This option only applies to the editing of piping specs.

Piping Specification Material Description Builder

Enables or disables the automatic creation of part material descriptions based on the rules that you define in the **Material Descriptions Rule** node. For more information on defining rules, see *Material Description Rule* (on page 477). The material descriptions are created when you use the **Select Commodity Code** dialog box. You can also set this option in the Catalog task by going to **Tools > Options**, selecting the **Piping Specifications** tab, and then select or clear the **Create material descriptions by rule** option.

Piping Specification Notes Option

Specifies how you want to display the piping specification standard notes (Piping > Piping Specifications > Notes in the catalog hierarchy) when editing piping specification in the Catalog task. You can display either a numeric value or textural value for the notes. For more information about defining notes, see *Standard Notes* (on page 355).

Purchase Length Basis Option

Specifies the basis on which the purchase length in piping specifications is determined. The purchase length option applies to all piping materials classes within a piping specification.

- **By user** - The purchase length is based on the commodity option specified by the piping designer. In other words, all pipe stock lengths for the applicable pipe run are based on the same purchase length.

- **By system** - All purchase length options provided by the specification writer are to be used. In other words, multiple pipe stock lengths for the applicable pipe run are based on the purchase lengths of all commodity options specified for the pipe stock in the piping commodity filter.

Stud Bolt Length Round Off Option

Specifies the method to use for rounding stud bolt length calculations. If this option is set to "Use Value", then the round off value that you specify in **Stud Bolt Length Round Off Value** is used. If this option is set to "Use list of preferred bolt lengths", then the values that you have defined in *Preferred Stud Bolt Length* (on page 415) are used.

Stud Bolt Length Round Off Value

Specifies the length round off value to use in length calculations. The **Stud Bolt Length**

Round Off Option must be set to "Use Value" in order to use this value. The computed bolt length is rounded up to the next increment of the value defined here. For example, if you enter 0.25in here and the calculated bolt length is 3.05in, the bolt length is rounded up to 3.25in. There is a 0.0001 inch tolerance applied to the computed length. Therefore, a stud bolt with a computed length of 2.75001 inches is reported as 2.75 rather than 3.00.

Specification or Catalog Verification Option

Enables or disables the automated verification of the piping specification or the piping catalog data being edited.

Tap End Stud Bolt Length Round Off Option

Specifies the method to use for rounding tap end stud bolt length calculations. If this option is set to "Use Value", then the round off value that you specify in **Tap End Stud Bolt Length Round Off Value** is used. If this option is set to "Use list of preferred Tap End Stud Bolt Lengths", then the values that you have defined in *Preferred Tap End Stud Bolt Length Rule* (on page 416) are used.

Tap End Stud Bolt Length Round Off Value

Specifies the length round off value to use in length calculations. The **Tap End Stud Bolt Length Round Off Option** must be set to "Use Value" in order to use this value. The computed bolt length is rounded up to the next increment of the value defined here. For example, if you enter 0.25in here and the calculated bolt length is 3.05in, the bolt length is rounded up to 3.25in. There is a 0.0001 inch tolerance applied to the computed length. Therefore, a stud bolt with a computed length of 2.75001 inches is reported as 2.75 rather than 3.00.

Undefined Service Limits Rule Option

Specifies if the absence of any temperature-pressure data is to be reported as an error, which must be corrected by the piping designer; or is reported as a warning, which can be ignored by the piping designer. This option only applies to a piping materials class where the optional Service Limits rule has been specified. For more information, see *Service Limits* (on page 419).

This option does not apply to the selection of a piping commodity from the piping commodity filter on the basis of the maximum (or minimum) temperature. Nor does is apply to the use of the piping commodity service limits data.

- Select "Absence of any temperature- pressure data to be reported as an error" for the absence of any temperature-pressure data to be reported as an error (the default setting).

- Select "Absence of any temperature- pressure data to be reported as a warning" for the absence of any temperature-pressure data to be reported as a warning.

Washer Creation Option

Specifies whether you want washers automatically created at bolted joints. Disable this option when washers are not tracked by material management. Even with this option disabled, you can still use the washer thickness for the bolt length calculation if the washer selection filter and accompanying washer part data are defined in the catalog.

NOTE You can create washers in the model but not have them reported by setting the **ReportingType** column on the **PipingCommodityMatlControlData** sheet for the washer.

See Also
Model Rules (on page 146)
Define Default Model Options (on page 156)

Model Rules

Model Rules are used across all piping material classes in the project. You should customize these rules based on what makes sense for your company.

You must define data for the following required rules: Default Project Options, Short Code Hierarchy Rule, Default Change of Direction, Default Commodity Selection Rule, Mating Ports, NPD Equivalence, Bolt Extension, Preferred Stud Bolt Length, Preferred Machine Bolt Length, Preferred Cap Screw Length, Machine Bolt Length Calculation Tolerance, Stud Bolt Length Calculation Tolerance, Cap Screw Length Calculation Tolerance, Weld Model Representation Rule, and Weld Type Rule.

The optional piping specification rules are: Allowable Piping Materials Class, Minimum Pipe Length Rule, Minimum Pipe Length Purchase, Port Alignment, Pipe Bending Elongation, Flared Pipe, Field Lining Thickness, Fluid Density Rule, Slip On Flange Setback Distance, Plate Flange Setback Distance, Weld Gap Rule, End Preparation Compatibility Exceptions Rule, Nominal Piping Diameter Compatibility Exceptions Rule, Field Fit Length, and Bolt Length Lookup Rule.

What do you want to do?

- *Define Bolt Commodity Code Substitution* (on page 150)
- *Define Bolt Diameter Equivalence* (on page 151)
- *Define Pipe Bend Radius Multiplier* (on page 164)
- *Define Automated Bolt Selection at Spec Break* (on page 148)
- *Define Bolt Selection Filters for Nozzles* (on page 152)
- *Define Calculation ProgIDs* (on page 153)
- *Define Bolt Thread Extensions* (on page 152)
- *Define Bolt Length Lookup Rule* (on page 151)
- *Define Cap Screw Length Calculation Tolerance* (on page 154)
- *Define Commodity Code Rules* (on page 154)
- *Define Component Insulation Exclusion* (on page 155)
- *Define Default Change of Direction* (on page 155)
- *Define Default Piping Commodity Selection* (on page 156)
- *Define Default Model Options* (on page 156)
- *Define End Preparation Compatibility* (on page 156)
- *Define End Preparation Compatibility Exceptions* (on page 157)
- *Define Field Fit Length* (on page 158)
- *Define Flared Pipe Information* (on page 158)
- *Define Fluid Density* (on page 159)
- *Define Gasket Selection Filters for Nozzles* (on page 159)

Automated Bolt Selection at Spec Break Rule

The **Automated Bolt Selection at Spec Break Rule** is an optional rule that enables the spec writer to define the preferred bolting (that is, the bolts, nuts and washers) to be used at spec breaks when the default bolting for the applicable piping materials classes is different.

This rule:

- Automatically determines the bolting to be used at a spec break when the default bolting of spec A differs from the default bolting for spec B.

- Automatically determines the bolting to be used at a spec break when a third bolt is required at the spec break. For example, neither the default bolting of spec A nor the default bolting for spec B represent the proper bolting to be used at the spec break.

☐ NOTE The preferred bolting is determined independently of the sequence of the bolted ends in the piping specification of the bolted ends in the 3D model.

The software selects the bolting from each piping materials class and compares them. If the bolt sets differ, the software selects the preferred bolting for the spec break on the basis of this rule that is independent of either piping materials class.

In general, the stronger bolt should be selected at a spec break. However, the strength of the bolt is not always the determining factor. If one of the fittings at the bolted joint is plastic, the weaker bolt may be the appropriate bolt to use. The materials engineer must consider the relative strength of the bolts to be used within the piping specification, and must take into account whether the stronger (or weaker) bolt is to be used on the basis of the materials category of the two flanged fittings forming the bolted joint.

Likewise, one piping materials class might not always be the best choice when being compared with a second, specific piping materials class under certain operating conditions (for example, where consideration of the temperature might be required).

Although this rule provides an automated selection for the piping designer, and results in the preferred bolting being selected, it does require that the specification writer pre-define the bolting selection for all possible spec breaks.

★ IMPORTANT

If you define any records using this rule, the software only uses this spec break rule to check for the connection parts at the spec break condition. You must define all of the possible combinations or records that can be encountered in the model for the spec break condition. If an entry is defined in the rule, the software checks the rule. If at least one entry is defined in the rule, then the software does *not* check for the connection parts in the selection filters as it would in the default behavior.

If you are using this rule, and any combination or record is missing at the spec break, the software generates a ToDo List item and writes the following error in the Error log file:

```
Spec break Rule record does not exist for the data
```

For example, you define the automated bolt selection rule for two-inch NPD but do not define automated bolt selection for four-inch NPD. When you place a four-inch spec break bolted joint, the reference data returns an error even when the four-inch data is defined in the bolt selection filters of both specs.

The preferred bolting is selected from the piping specification on the basis of the following data:

Piping Materials Class, End A (Conditionally Required)

Type the unique name of the piping materials class for one end of the bolted joint.

Revision Number, End A (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint. The combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

Piping Materials Class, End B (Conditionally Required)

Type the unique name of the piping materials class for one end of the bolted joint.

Revision Number, End B (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint. The combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

End preparation, End A (Conditionally Required)

Select the select list (codelist) value that represents the end preparation, such as **Raised Face Flange**, for one end of the bolted joint.

Termination subclass, End A (Conditionally Required)

Select the select list (codelist) value that represents the termination subclass, such as **Flanged**, for one end of the bolted joint.

Termination class, End A (Conditionally Required)

Select the select list (codelist) value that represents the termination class, such as **Bolted**, for one end of the bolted joint.

End preparation, End B (Conditionally Required)

Select the select list (codelist) value that represents the end preparation, such as **Raised Face Flange**, for the other end of the bolted joint.

Termination subclass, End B (Conditionally Required)

Select the select list (codelist) value that represents the termination subclass, such as **Flanged**, for the other end of the bolted joint.

Termination class, End B (Conditionally Required)

Select the select list (codelist) value that represents the termination class, such as **Bolted**, for the other end of the bolted joint.

Pressure rating, End A (Conditionally Required)

Select the short description that represents the pressure rating for one end of the bolted joint. This pressure rating classification property defines the envelope of pressure to which the bolted joint can be subjected.

Pressure rating practice, End A (Conditionally Required)

Select the select list (codelist) value that represents the pressure rating practice, such as

U.S. Practice, **DIN**, and so on, for one end of the bolted joint.

Pressure rating, End B (Conditionally Required)

Select the short description that represents the pressure rating for the other end of the bolted joint. This pressure rating classification property defines the envelope of pressure to which the bolted joint can be subjected.

Pressure rating practice, End B (Conditionally Required)

Select the select list (codelist) value that represents the pressure rating practice, such as **U.S. Practice**, **DIN**, and so on, for the other end of the bolted joint.

End Standard, End A (Conditionally Required)

Select the select list (codelist) value that represents the end standard, or source of the catalog data, applicable to one end of the bolted joint.

End Practice, End A (Conditionally Required)

Select the select list (codelist) value that represents the end practice, such as **U.S. Practice**, **DIN**, and so on, for one end of the bolted joint.

End Standard, End B (Conditionally Required)

Select the select list (codelist) value that represents the end standard, or source of the catalog data, applicable to the other end of the bolted joint.

End Practice, End B (Conditionally Required)

Select the select list (codelist) value that represents the end practice, such as **U.S. Practice**, **DIN**, and so on, for the other end of the bolted joint.

Materials grade, End A (Conditionally Required)

Select the select list (codelist) value that represents the material code, specification, grade-temper, and class for one end of the bolted joint.

Materials Category, End A (Conditionally Required)

Select the select list (codelist) value that represents the classification for the materials grade.

Materials Practice, End A (Conditionally Required)

Select the select list (codelist) value that represents the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Materials Grade, End B (Conditionally Required)

Select the select list (codelist) value that represents the material code, specification, grade-temper, and class for one end of the bolted joint.

Materials Category, End B (Conditionally Required)

Select the select list (codelist) value that represents the classification for the materials grade.

Materials Practice, End B (Conditionally Required)

Select the select list (codelist) value that represents the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Nominal Piping Diameter, From (Conditionally Required)

Enter the value that represents the lower bound of the nominal piping diameter for which the bolting selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound, because the ranges for this rule are considered to be mutually exclusive. In other words, this range is based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter, To (Conditionally Required)

Enter the value that represents the upper bound of the nominal piping diameter for which the bolting selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound because the ranges for this rule are considered to be mutually exclusive. In other words, this range will be based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter Unit of Measure (Conditionally Required)

Select the select list (codelist) value that represents the unit of measure for the nominal piping diameter range.

NOTE If the **Nominal Piping Diameter Equivalence** rule exists in this Piping Specification, the data for this rule is determined on the basis of the value for the nominal piping diameter in the *primary* system of units, which is represented by the active size defined by the piping designer in the 3D model. Otherwise, the data for this rule is determined on the basis of the nominal piping diameter in the *secondary* system of units as defined by the Nominal Piping Diameter Equivalence rule. Consequently, it is not necessary for the spec writer to define the data for the rule in both nominal piping diameter systems of units. Nor will it be necessary for the piping designer to define the active size in the system of units used by the spec writer.

The unit of measure types for Nominal Piping Diameter is permanently restricted to inches and millimeters.

Maximum Temperature (Conditionally Required)

Enter the value that represents the maximum temperature for which the bolting is applicable.

If piping materials class A and piping materials class B form a spec break; this rule may specify that the preferred bolting to be used is the one from piping materials class B. However, there may be situations where, for example, the bolting in piping materials class B should be used when the temperature is less than 500º F; but the bolting from piping materials class A should be used when the temperature exceeds 500º F.

Maximum pressure (Conditionally Required)

Enter the value that represents the maximum pressure for which the bolting is applicable.

Bolting Data Determined by the Piping Specification

Based on the criteria values that you defined above, the software uses these bolt values:

Preferred Source Contractor Commodity Code (Conditionally Required)

Type the engineering contractor's commodity code if different from the client's commodity

code for the bolts to use.

NOTE The commodity code can include special characters such as a decimal. It may appear to be a numeric value such as. **25.210**, or include one or more blanks, such as **DCCAA   HHH   GHU   GE**, where fields in the commodity code are undefined.

Preferred Contractor Commodity Code for Nuts (Conditionally Required)

Type the engineering contractor's commodity code, if different from the client's commodity code, for the nuts to use.

NOTE The commodity code can include special characters such as a decimal. It may appear to be a numeric value such as. **25.210**, or include one or more blanks, such as **DCCAA   HHH   GHU   GE**, where fields in the commodity code are undefined.

Preferred Contractor Commodity Code for Washers (Conditionally Required)

Type the engineering contractor's commodity code, if different from the client's commodity code, for the washers to use.

NOTE The commodity code can include special characters such as a decimal. It may appear to be a numeric value such as. **25.210**, or include one or more blanks, such as **DCCAA   HHH   GHU   GE**, where fields in the commodity code are undefined.

Piping Materials Class, Source (Conditionally Required)

Type the unique name of the piping materials class from which the bolting at the spec break is to be selected.

Revision Number, Source (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer. The combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

Bolt Option, Source (Conditionally Required)

Select the select list (codelist) value that represents an optional bolt selection that has been enabled by the spec writer. A default bolt option represents the bolt that should be used when the piping designer has not explicitly selected one. **Nut Option, Source** (Conditionally Required)

Select the select list (codelist) value that represents an optional nut selection that has been enabled by the spec writer. A default nut option represents the nut that should be used when the piping designer has not explicitly selected one. **Washer Option, Source** (Conditionally Required)

Select the select list (codelist) value that represents an optional washer selection that has been enabled by the spec writer. A default washer option represents the washer that should be used when the piping designer has not explicitly selected one.

Automated Clamp Selection at Spec Break Rule

The **Automated Clamp Selection at Spec Break Rule** is an optional rule that enables the spec writer to define the preferred clamp to be used at spec breaks when the default clamp for the two applicable piping materials classes is different.

★ IMPORTANT

If you define any records using this rule, the software only uses this spec break rule to check for the connection parts at the spec break condition. You must define all of the possible combinations or records that can be encountered in the model for the spec break condition. If at least one entry is defined in the rule, then the software does *not* check for the connection parts in the selection filters as it would in the default behavior.

If you are using this rule, and any combination or record is missing at the spec break, the software generates a **To Do List** item and writes the following error in the Error log file:

`Spec break Rule record does not exist for the data`

For example, you define the automated clamp selection rule for two-inch NPD but do not define automated clamp selection for four-inch NPD. When you place a four-inch spec break clamped joint, the reference data returns an error even when the four-inch data is defined in the clamp selection filters of both specs.

The preferred clamp is selected from the piping specification on the basis of the following data:

Piping Materials Class, End A (Conditionally Required)

Type the unique name of the piping materials class for one end of the mechanical joint.

Revision Number, End A (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the mechanical joint. The combination of the piping materials class and the revision number uniquely identifies the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

Piping Materials Class, End B (Conditionally Required)

Type the unique name of the piping materials class for one end of the mechanical joint.

Revision Number, End B (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the mechanical joint. The combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

End Preparation, End A (Conditionally Required)

Select the select value (codelist) value for the end preparation, such as **Victaulic® Grooved Flexible End**, for one end of the mechanical joint.

Termination Subclass, End A (Conditionally Required)

Select the select value (codelist) value for the termination subclass, such as **Mechanical Joint with Clamp**, for one end of the mechanical joint.

Termination Class, End A (Conditionally Required)

Select the select value (codelist) value for the termination class, such as **Mechanical**, for one end of the mechanical joint.

End Preparation, End B (Conditionally Required)

Select the select value (codelist) value for the end preparation, such as **Victaulic® Grooved Flexible End**, for the other end of the mechanical joint.

Termination Subclass, End B (Conditionally Required)

Select the select value (codelist) value for the termination subclass, such as **Mechanical Joint with Clamp**, for the other end of the mechanical joint.

Termination Class, End B (Conditionally Required)

Select the select value (codelist) value for the termination class, such as **Mechanical**, for the other end of the mechanical joint.

End Standard, End A (Conditionally Required)

Select the select value (codelist) value for the end standard, or source of the catalog data, applicable to one end of the bolted joint.

End Practice, End A (Conditionally Required)

Select the select value (codelist) value for the end practice, such as **U.S. Practice**, **DIN**, and so on, for one end of the bolted joint.

End Standard, End B (Conditionally Required)

Select the select value (codelist) value for the end standard, or source of the catalog data, applicable to the other end of the bolted joint.

End Practice, End B (Conditionally Required)

Select the select value (codelist) value for the end practice, such as **U.S. Practice**, **DIN**, and so on, for the other end of the bolted joint.

Materials Grade, End A (Conditionally Required)

Select the select value (codelist) value for the material code, specification, grade-temper, and class for one end of the mechanical joint.

Materials Category, End A (Conditionally Required)

Select the select value (codelist) value for the classification for the materials grade.

Materials Practice, End A (Conditionally Required)

Select the select value (codelist) value for the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Materials Grade, End B (Conditionally Required)

Select the select value (codelist) value for the material code, specification, grade-temper, and class for one end of the mechanical joint.

Materials Category, End B (Conditionally Required)

Select the select value (codelist) value for the classification for the materials grade.

Materials Practice, End B (Conditionally Required)

Select the select value (codelist) value for the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Nominal Piping Diameter, From (Conditionally Required)

Enter the value that represents the lower bound of the nominal piping diameter for which the clamp selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound because the ranges for this rule are considered to be mutually exclusive. In other words, this range will be based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter, To (Conditionally Required)

Enter the value that represents the upper bound of the nominal piping diameter for which the clamp selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound because the ranges for this rule are considered to be mutually exclusive. In other words, this range will be based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter Units (Conditionally Required)

Select the select value (codelist) value for the unit of measure for the nominal piping diameter range.

NOTE If the **Nominal Piping Diameter Equivalence** rule exists in this Piping Specification, the data for this rule is determined on the basis of the value for the nominal piping diameter in the *primary* system of units, which is represented by the active size defined by the piping designer in the 3D model. Otherwise, the data for this rule is determined on the basis of the nominal piping diameter in the *secondary* system of units as defined by the Nominal Piping Diameter Equivalence rule. Consequently, it is not necessary for the spec writer to define the data for the rule in both nominal piping diameter systems of units. Nor will it be necessary for the piping designer to define the active size in the system of units used by the spec writer.

The unit of measure types for Nominal Piping Diameter is permanently restricted to inches and millimeters.

Clamp Data Determined by the Piping Specification

Based on the values defined above, this clamp information should be used:

Contractor Commodity Code Source (Conditionally Required)

Type the engineering contractor's commodity code, if different from the client's commodity code. This is the commodity code that is intended to be used during the design phase.

NOTE The commodity code can include special characters such as a decimal. It may appear to be a numeric value such as. **25.210**, or include one or more blanks, such as **DCCAA HHH GHU GE**, where fields in the commodity code are undefined.

Piping Materials Class, Source (Conditionally Required)

Type the unique name of the piping materials class from which the clamp at the spec break is to be selected.

Revision Number, Source (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer. The

combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

Clamp Option (Conditionally Required)

Enumerated value that represents an optional clamp selection that has been enabled by the spec writer. A default clamp option represents the clamp that should be used when the piping designer has not explicitly selected one.

Automated Gasket Selection at Spec Break Rule

The **Automated Gasket Selection at Spec Break** rule is an optional rule that enables the spec writer to define the preferred gasket to be used at spec breaks when the default gasket for the two applicable piping materials classes differs.

This rule:

- Automatically determines the gasket to be used at a spec break when the default gasket of spec A differs from the default gasket for spec B but it is not obvious which gasket should be used.

- Automatically determines the gasket to be used at a spec break where a non-default gasket is required at the spec break. For example, neither the default gasket of spec A nor the default gasket for spec B represent the proper gasket to be used at the spec break.

- Automatically determines the gasket to be used at a spec break while avoiding the situation of requiring the materials engineer to add a gasket of a lower pressure classification than that of the piping materials class. For example, a spec break occurring at the outlet (lower pressure rating) of a pressure relief valve. Typically, the best practice of a materials engineer is to never include a gasket of a lower pressure classification than that of the piping materials class.

- Automatically determines the gasket to be used at a spec break based on the process conditions. For example, the operating fluid and the operating temperature of the bolted joint.

⭐ **IMPORTANT**

If you define any records using this rule, the software only uses this spec break rule to check for the connection parts at the spec break condition. In this case, the **Gasket Selection for Mismatched Bolted Ends** (see "**Model Options**" on page 434) option has no significance. In this situation, the gasket selection is based only on the automated spec break rule. You must define all of the possible combinations or records that can be encountered in the model for the spec break condition. If at least one entry is defined in the rule, then the software does *not* check for the connection parts in the selection filters as it would in the default behavior.

In the case of a spec break:

1. The software checks for a spec break rule. If the spec break rule is defined, Smart 3D selects the gasket based on the rule.

2. If the spec break rule is not defined, then Smart 3D compares the mating port data.

3. If the mating ports are the same, Smart 3D uses the priority to select the gasket.

4. If the mating ports are different, then Smart 3D uses the **Gasket Selection for Mismatched Bolted Ends** to select the gasket.

If you are using this rule, and any combination or record is missing at the spec break, the software generates a **To Do List** item and writes the following error in the Error log file:

```
Spec break Rule record does not exist for the data
```

For example, you define the automated gasket selection rule for two-inch NPD but do not define automated gasket selection for four-inch NPD. When you place a four-inch spec break gasket joint, the reference data returns an error even when the four-inch data is defined in the gasket selection filters of both specs.

NOTE The preferred gasket is determined independently of the sequence of the bolted ends in the piping specification versus the sequence of the bolted ends in the 3D model.

The gasket is selected from each piping materials class and compared. If the gaskets differ, the preferred gasket for the spec break is selected on the basis of a rule that is independent of either piping materials class.

Although this rule provides an automated selection for the piping designer, and results in the preferred gasket being selected, it does require the spec writer to pre-define the gasket selection for all possible spec breaks.

Piping Materials Class, End A (Conditionally Required)

Type the unique name of the piping materials class for one end of the bolted joint.

Revision Number, End A (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint. The combination of the piping materials class and the revision number will uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

Piping Materials Class, End B (Conditionally Required)

Type the unique name of the piping materials class for one end of the bolted joint.

Revision Number, End B (Conditionally Required)

Type the revision number of the piping materials class, as assigned by the spec writer, for one end of the bolted joint. The combination of the piping materials class and the revision number uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the system.

End preparation, End A (Conditionally Required)

Select the select value (codelist) value for the end preparation, such as **Raised Face Flange**, for one end of the bolted joint.

Termination Subclass, End A (Conditionally Required)

Select the select value (codelist) value for the termination subclass, such as **Flanged**, for one end of the bolted joint.

Termination Class, End A (Conditionally Required)

Select the select value (codelist) value for the termination class, such as **Bolted**, for one end of the bolted joint.

End Preparation, End B (Conditionally Required)

Select the select value (codelist) value for the end preparation, such as **Raised Face Flange**, for the other end of the bolted joint.

Termination Subclass, End B (Conditionally Required)

Select the select value (codelist) value for the termination subclass, such as **Flanged**, for the other end of the bolted joint.

Termination Class, End B (Conditionally Required)

Select the select value (codelist) value for the termination class, e.g. Bolted, for the other end of the bolted joint.

Pressure Rating, End A (Conditionally Required)

Select the short description for the pressure rating for one end of the bolted joint. This pressure rating classification property defines the envelope of pressure to which the bolted joint may be subjected.

Pressure Rating Practice, End A (Conditionally Required)

Select the select value (codelist) value for the pressure rating practice, such as **U.S. Practice**, **DIN**, and so on, for one end of the bolted joint.

Pressure Rating, End B (Conditionally Required)

Select the short description for the pressure rating for the other end of the bolted joint. This pressure rating classification property defines the envelope of pressure to which the bolted joint may be subjected.

Pressure Rating Practice, End B (Conditionally Required)

Select the select value (codelist) value for the pressure rating practice, such as **U.S. Practice**, **DIN**, and so on, for the other end of the bolted joint.

End Standard, End A (Conditionally Required)

Select the select value (codelist) value for the end standard, or source of the catalog data, applicable to one end of the bolted joint. If the spec writer has included the end standard in the bolt selection filter, the end standard for the bolted ends will be used. Otherwise, it will not be used to query for the bolt.

End Practice, End A (Conditionally Required)

Select the select value (codelist) value for the end practice, such as **U.S. Practice**, **DIN**, and so on, for one end of the bolted joint.

End standard, End B (Conditionally Required)

Select the select value (codelist) value for the end standard, or source of the catalog data, applicable to the other end of the bolted joint. If the spec writer has included the end standard in the bolt selection filter, the end standard for the bolted ends will be used. Otherwise, it will not be used to query for the bolt.

End practice, End B (Conditionally Required)

Select the select value (codelist) value for the end practice, such as **U.S. Practice**, **DIN**, and so on, for the other end of the bolted joint.

Materials Grade, End A (Conditionally Required)

Select the select value (codelist) value for the material code, specification, grade-temper, and class for one end of the bolted joint.

Materials Category, End A (Conditionally Required)

Select the select value (codelist) value for the classification for the materials grade.

Materials Practice, End A (Conditionally Required)

Select the select value (codelist) value for the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Materials Grade, End B (Conditionally Required)

Select the select value (codelist) value for the material code, specification, grade-temper, and class for one end of the bolted joint.

Materials Category, End B (Conditionally Required)

Select the select value (codelist) value for the classification for the materials grade.

Materials Practice, End B (Conditionally Required)

Select the select value (codelist) value for the industry practice, such as **U.S. Practice**, **DIN**, and so on, for the materials grade.

Nominal Piping Diameter, From (Conditionally Required)

Specifies the value that represents the lower bound of the nominal piping diameter for which the gasket selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound because the ranges for this rule are considered to be mutually exclusive. In other words, this range will be based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter, To (Conditionally Required)

Specifies the value that represents the upper bound of the nominal piping diameter for which the gasket selection data applies.

The range query for the nominal piping diameter is based on the value from the 3D model being greater than or equal to the lower bound because the ranges for this rule are considered to be mutually exclusive. In other words, this range will be based on discrete values. The upper bound of one range will not have the same value as the lower bound of the subsequent range.

Nominal Piping Diameter Units (Conditionally Required)

Select the select value (codelist) value for the unit of measure for the nominal piping diameter range.

NOTE If the **Nominal Piping Diameter Equivalence** rule exists in this Piping Specification, the data for this rule is determined on the basis of the value for the nominal piping diameter in the *primary* system of units, which is represented by the active size defined by the piping designer in the 3D model. Otherwise, the data for this rule is determined on the basis of the nominal piping diameter in the *secondary* system of units as defined by the Nominal Piping Diameter Equivalence rule. Consequently, it is not necessary for the spec writer to define the data for the rule in both nominal piping diameter systems of units. Nor will it be necessary for the piping designer to define the active size in the system of units used by the spec writer.

The unit of measure types for Nominal Piping Diameter is permanently restricted to inches and millimeters.

Fluid Code (Conditionally Required)

Select the select value (codelist) value for the fluid code for the bolted joint. Fluid code is one of the factors that a piping engineer must consider when selecting a gasket, because the fluid normally comes in contact with the gasket.

One specific piping materials class can be used to transfer more than one type of media. Each fluid can differ in chemical composition and temperature that may require gasket types other than the piping materials class's default gasket. However, the selection of the gasket from the gasket selection filter may be based on the fluid code as a means of addressing this requirement. For that reason, it may be necessary for the gasket selection at spec breaks to be based on the operating fluid.

Fluid system (Conditionally Required)

Select the select value (codelist) value for the fluid system for the bolted joint.

Maximum Temperature (Conditionally Required)

Specifies the value that represents the maximum temperature for which the gasket is applicable.

If piping materials class A and piping materials class B form a spec break, this rule may specify that the preferred gasket to be used is the one from piping materials class B. However, there may be situations where, for example, the gasket in piping materials class B should be used when the temperature is less than 500º F but the gasket from piping materials class A should be used when the temperature exceeds 500º F.

Maximum Pressure (Conditionally Required)

Enter the value that represents the maximum pressure for which the gasket is applicable.

Gasket Data Determined by the Piping Specification

Based on the values above, use this gasket:

Preferred Contractor Commodity Code Gasket (Conditionally Required)

Type the engineering contractor's commodity code, if different from the client's commodity code, of the gasket to use.

☰ NOTES

- The commodity code of the gasket reflects any variation in gasket thickness that results from a difference in the nominal piping diameter.

- The commodity code can include special characters such as a decimal. It may appear to be a numeric value such as. **25.210**, or include one or more blanks, such as **DCCAA HHH   GHU   GE**, where fields in the commodity code are undefined.

Piping Materials Class, Source (Conditionally Required)

Type the unique name of the piping materials class from which the gasket at the spec break is selected.

Revision Number, Source of gasket (Conditionally Required)

Type the revision number of the piping materials class as assigned by the spec writer. The combination of the piping materials class and the revision number uniquely identify the data for this rule.

This property is under the control of the spec writer. It is not modified or validated by the

system.

Gasket Option, Source of Gasket (Conditionally Required)

Enumerated value that represents an optional gasket selection that has been enabled by the spec writer. A default gasket option represents that gasket that should be used when the piping designer has not explicitly selected one.

If the rule for determining the preferred gasket to be used at a spec break is complete, the spec writer has an option to prevent the piping designer from using gasket options at a spec break.

Bolt Commodity Code Substitution Rule

The **Bolt Commodity Code Substitution Rule** node is an optional rule that you can use to define a bolt's commodity code using the dimensional characteristics of the bolt. This optional rule applies to stud bolts, machine bolts, cap screws, tap end stud bolts, and combination stud bolts.

This rule is used when the material control system requires the bolt commodity code to serve as a part number that reflects the bolt diameter and the bolt length. The bolt's commodity code used in the Piping Specification does not include the bolt diameter and the bolt length because those values are not known until the bolted joint is placed in the 3D model. This rule updates the commodity code of the bolt set in the model to reflect the bolt length and the bolt diameter.

Bolt Commodity Code (Required)

Enter the commodity code to use for the material control system. This commodity code is not used to query the piping commodity material data for the bolt part.

Bolt Diameter (Required)

Specify the diameter of the bolt. Include the unit of measurement, **in** or **mm**, when defining this value.

Bolt Length (Required)

Specify the length of the bolt. Include the unit of measurement, **in** or **mm**, when defining this value.

Contractor Commodity Code (Required)

Specifies the commodity code for the bolt (or the substitution cap screw) as defined in the *Bolt Selection Filter* (on page 375).

See Also
Model Rules (on page 146)
Bolt Commodity Code Substitution Rule (on page 457)
Define Bolt Commodity Code Substitution (on page 150)

Bolt Diameter Equivalence Rule

The **Bolt Diameter Equivalence Rule** node is an optional rule that you can use to define a correlation between ASME bolt diameters and ISO bolt diameters. This rule is only intended to be used in determining an equivalent bolt diameter for reporting purposes. The delivered sample data represents a correlation between ASME bolt diameters and ISO bolt diameters from ½ inch to 2 inches.

This rule is used when you enable the **Bolt Diameter Equivalence Option** in **Model Options**.

Bolt Diameter In Primary Units (Required)

Specifies the bolt diameter in the first unit of measurement.

Bolt Diameter In Secondary Units (Required)

Specifies the bolt diameter in the second unit of measurement to equate to the primary unit of measurement.

Primary Units of Measure (Required)

Specifies the unit of measurement, **in** or **mm** for example, for the values in the **Bolt Diameter Primary Units** column.

Secondary Units of Measure (Required)

Specifies the unit of measurement, **in** or **mm** for example, for the values in the **Bolt Diameter Secondary Units** column.

See Also

Bolt Extension

The **Bolt Extension Rule** node defines the length of the exposed threads for the bolt length calculation for both studs and machine bolts from the bolted end generic data. The bolt extension also includes any additional length required for stud tensioners. The nut height and the washer thickness, if applicable, do not affect the bolt extension. You can define a standard bolt extension and as many as five alternate bolt extension values.

This rule is used when you enable the **Bolt Length Calculation Option** in the **Model Options**.

Alt Bolt Extension for Machine Bolts (Optional)

Specifies an alternate bolt extension. Be sure to include the units when specifying this value, for example, **0.125in**.

Alt Bolt Extension For Studs (Optional)

Specifies an alternate bolt extension. Be sure to include the units when specifying this value, for example, **0.125in**.

End Preparation (Required)

Type the end preparation code for the bolt extension.

End Standard (Required)

Type the end standard code for the bolt extension.

Nominal Piping Diameter (Required)

Specifies the pipe diameter for the bolted end.

Nominal Piping Diameter Units (Required)

Specifies the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter** column.

Pressure Rating (Required)

Type the pressure rating short description for the bolt extension. This property defines the envelope of pressure to which the bolted joint may be subjected.

Pressure Rating Practice (Required)

Select the pressure rating practice. Options are defined in the **Pressure Rating** select list.

Standard Bolt Extension For Studs (Required)

Specifies the bolt extension for studs. Be sure to include the units when specifying this value, for example, **0.125in**.

Standard Bolt Extension For Machine Bolts (Required)

Specifies the bolt extension for machine bolts. Be sure to include the units when specifying this value, for example, **0.125in**.

Termination Class (Required)

Select the termination class code. Options are defined in the **End Preparation** select list.

Termination Sub Class (Required)

Select the termination subclass code. Options are defined in the **End Preparation** select list.

See Also

Bolt Length Calculations (on page 308)
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)
Bolt Selection Filter for Nozzles (on page 462)
Machine Bolt Length Calculation Tolerance (on page 403)
Preferred Machine Bolt Length (on page 414)
Preferred Stud Bolt Length (on page 415)
Stud Bolt Length Calculation Tolerance (on page 421)

Bolt Length Lookup Rule

The **Bolt Length Lookup Rule** node is an optional rule that is used to define the bolt lengths used for typical piping part assemblies equivalent to the values defined by corresponding rules in the reference data. The **Bolt Length Lookup Rule** is used to ensure that the bolts lengths ordered in advance by the material requisitioning system, such as **SmartPlant Materials**, match the MTO reports or isometric.b file (Isometric Bill of Material).

Spec Name 1 (Required)

Define a unique piping materials class name for the first part of the bolted joint.

Revision Number 1 (Optional)

Define a revision number of the piping material class, as assigned by the specification writer, for the first part of the bolted joint. The combination of the piping material class and the revision number uniquely identify the data for this rule.

NOTE This property is under the control of specification writer. It is not modified or validated by the system.

Short Code 1 (Required)

Type a name for specific type of piping commodity, such as a gate valve.

Option Category 1 (Optional)

Define a value for the optional commodity selection enabled by the specification writer. If the piping designer does not explicitly select a piping commodity, then the default commodity option is used.

Option Code 1 (Optional)

Define a value to represent the category of the commodity option. The specification writer can specify additional custom values other than the system defined values.

NPD 1 (Required)

Type a nominal piping diameter for the first part of the bolted joint.

NPD 1 Units (Required)

Define a value that represents the system of units for the nominal piping diameter for the first part of the bolted joint.

Spec Name 2 (Required)

Define a unique class name for the second part of the bolted joint.

Revision Number 2 (Optional)

Type a revision number of the piping material class, as assigned by the specification writer, for the second part of the bolted joint. The combination of the piping material class and the revision number uniquely identify the data for this rule.

NOTE This property is under the control of specification writer. It is not modified or validated by the system.

Short Code 2 (Required)

Type a name for specific type of piping commodity, such as a gate valve.

Option Category 2 (Optional)

Define a value for the optional commodity selection enabled by the specification writer. If the piping designer does not explicitly select a piping commodity, then the default commodity option is used.

Option Code 2 (Optional)

Define a value to represent the category of the commodity option. The specification writer can specify additional custom values other than the system defined values.

NPD 2 (Required)

Type a nominal piping diameter for the second part of the bolted joint.

NPD 2 Units (Required)

Type a value that represents the system of units for the nominal piping diameter for the second part of the bolted joint.

Spec Name 3 (Optional)

Define a unique class name for the third part of the bolted joint.

Revision Number 3 (Optional)

Type a revision number of the piping material class, as assigned by the specification writer, for the third part of the bolted joint. The combination of the piping material class and the revision number uniquely identify the data for this rule.

NOTE This property is under the control of specification writer. It is not modified or validated by the system.

Short Code 3 (Optional)

Type a name for specific type of piping commodity, such as a gate valve.

Option Category 3 (Optional)

Define a value for the optional commodity selection enabled by the specification writer. If the piping designer does not explicitly select a piping commodity, then the default commodity option is used.

Option Code 3 (Optional)

Define a value to represent the category of the commodity option. The specification writer can specify additional custom values other than the system defined values.

NPD 3 (Optional)

Type a nominal piping diameter for the third part of the bolted joint.

NPD 3 Units (Optional)

Define a value that represents the system of units for the nominal piping diameter for the third part of the bolted joint.

Bolt Length (Required)

Type a value for the bolt length of the bolted joint assembly.

NOTES

- At least two parts are required to form a bolted joint assembly. Therefore, defining data for the third part in this rule is optional.

- If the specified bolted joint assembly is not found in the defined rule or the rule itself does not exist, the bolt length should be computed using system preferred bolt length calculation, see *Bolt Length Calculations* (on page 308).

See Also
Model Rules (on page 146)

Bolt Selection Filter for Nozzles

The **Bolt Selection Filter For Nozzles** node defines data for any nozzle that requires special bolting, for example, cap screws that are required at a flat face or a raised face flangeless nozzle. The special bolting for nozzles is selected from the Piping Specification by the equipment and nozzle tag numbers. It is only necessary to define this data for those few nozzles that require special bolting. You do not have to create data for every nozzle in the project.

Bolt Extension Option (Conditionally Optional)

Specifies the bolt extension option code. The code is used in determining the length of the exposed threads for the bolt length calculation for both studs and machine bolts from the **Generic Bolt Data**. The bolt extension also includes any additional length required for stud tensioners. This field is required when **Bolting Requirements** is set to **Reportable bolts are required**.

Bolting Requirements (Optional)

Select the bolting requirement for the piping commodity. The following options are available:

- **Undefined** - The bolting requirement is undefined.

- **Bolting required** - The piping commodity requires a reportable set of bolts determined by the bolted joint, but based on a special bolt extension option. If you select this option, you must define the **Bolt Extension Option**.

- **Complete substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of threaded holes to match the drilling template applicable to the mating flange.

- **Complete substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of the bolted joint. Cap screws (or tap end stud bolts) are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of tapped holes to match the drilling template applicable to the mating flange.

- **Partial substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for threaded holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of threaded holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting

includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are threaded.

- **Partial substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of tapped holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are tapped.

- **Bolts supplied with nozzle and not to be reported** - The piping commodity is supplied with the necessary bolts included, such that the applicable bolts should not be reported.

- **Reportable bolts not required** - A set of bolts is not applicable to any end of this piping commodity because all ends are non-bolted. This option is the default for any piping commodity without any bolted ends.

- **Complete substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of threaded holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Complete substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of tapped holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Partial substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This option represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a partial set of threaded holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of the reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are threaded. This option is not available for nozzles.

- **Partial substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by fitting itself, for example a reducing flange, instead of some of the

bolts determined by the bolted joint. This represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This will address the situation where the smaller end of a reducing flange includes a partial set of tapped holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of a reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are tapped. This option is not available for nozzles.

- **Complete cap screw substitution for full threaded and tapped holes for each bolted end** - Each bolted end requires a reportable set of substitution cap screws for full threaded holes and also tapped holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation. In other words, this represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the through-bolted fitting includes a complete set of threaded holes and also tapped holes to match the drilling template applicable to the companion flange. This can be required, as an example, for a larger size asymmetrical lug body butterfly valve where tapped holes are required near the valve stem. This option is not available for nozzles.

🗐 NOTES

- Any through-bolted joint, where the Termination Subclass for one of the bolted ends indicates through-bolted end with bolt holes, but the Bolting Requirement property for the fitting at that same bolted end indicates a complete substitution of cap screws (or tap end stud bolts), the software considers it to be a bolted joint, not a through-bolted joint.

- Although two or more through-bolted fittings may be involved in forming a through-bolted connection, the software assumes that only one through-bolted fitting exists for any situation where either complete substitution or partial substitution with cap screws (or tap end stud bolts) applies. Furthermore, whenever two or more through-bolted fittings form a through-bolted connection, the software assumes that the bolts extend through all of the through-bolted fittings.

Cap Screw Contractor Commodity Code (Optional)

Specifies the engineering contractor's commodity code, if different from the client's commodity code, for any optional substitution cap screws (or substitution tap end stud bolts). Because the cap screw length (or tap end stud bolt length) is being computed, this commodity code cannot reflect the cap screw length (or tap end stud bolt length). You can choose to include the cap screw length (or tap end stud bolt length) as an embedded label in the material description, or determine the cap screw's commodity code by the Cap Screw Length, Cap Screw Diameter, and Materials Grade using the Bolt Commodity Code Substitution rule. The remainder of the cap screw data will be determined from the piping commodity material control data and the bolt part data by the cap screw's commodity code. Note that this commodity code may apply to a machine bolt. If this "cap screw" is determined to be a machine bolt by the value of the Bolt Type property in the bolt part data, an additional nut is reported with the machine bolt.

Cap Screw Diameter (Optional)

Specifies the diameter of any substitution cap screws (or substitution tap end stud bolts), if applicable. If a value is not specified, the software assumes that the diameter is identical to the Bolt Diameter for the applicable drilling template. This property only represents the diameter of cap screws (or tap end stud bolts) when a partial substitution with cap screws (or tap end stud bolts) applies. A value here is not required for a complete substitution with

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cap screws (or tap end stud bolts).

Comments (Optional)

Specify an optional brief description of the commodity code.

Contractor Commodity Code (Required)

Type the contractor commodity code, which identifies the bolt that you want to use from the *Bolt Part Data Sheet* (on page 307) sheet.

Equipment Tag Number (Required)

Specifies the model-wide unique identification name of the process equipment.

Fabrication Category (Optional)

Type the fabrication code that represents the responsibility for fabrication or erection. In the case of the complete substitution of bolts with cap screws, the Fabrication Category for the cap screws is determined by the Fabrication Category of the flanged fitting at the nozzle. In the case of the partial substitution of bolts with cap screws, the Fabrication Category for the cap screws is determined by the Fabrication Category of the bolts.

Fabrication Requirement (Optional)

Select the fabrication requirement.

Lubrication Requirements

Select the lubrication requirements code for the bolt.

Nozzle Tag Number (Required)

Specifies the unique identification for the nozzle located on the equipment defined in **Equipment Tag Number**.

Quantity of Cap Screws (Optional)

Specifies the number of machine bolts or stud bolts that are being replaced by cap screws or tap end stud bolts at each bolted end when **Bolting Requirements** is set to partial substitution. For non-thru bolted fittings, the number of cap screws (or tap end stud bolts) to be substituted for the machine bolts or stud bolts required by the drilling template is the same as the number of machine bolts or stud bolts to be replaced. However, for thru-bolted fittings with threaded holes, the number of cap screws required is twice the number of machine bolts or stud bolts being replaced. This value is not required for the complete substitution, where all bolts defined by the drilling template are replaced by cap screws (or tap end stud bolts). In that case, the software assumes that the quantity of cap screws (or tap end stud bolts) is identical to the number of bolt holes in the drilling template for each bolted end.

Supply Responsibility (Optional)

Specify the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

Tapped Hole Depth (Optional)

Specify the depth of the tapped hole in the valve or fitting that requires substitution cap screws (or substitution tap end stud bolts), if applicable. This value is used to compute the length of the cap screw. This value is not required for substitution cap screws at threaded holes or when the value of the Bolt Type property in the bolt part data indicates that the "cap screw" is actually a machine bolt. This property only represents the tapped hole depth of

cap screws, when a partial substitution of cap screws applies and is not required for a complete substitution of cap screws.

See Also
Bolt Length Calculations (on page 308)
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)
Bolt Selection Filter for Nozzles (on page 462)
Machine Bolt Length Calculation Tolerance (on page 403)
Preferred Machine Bolt Length (on page 414)
Preferred Stud Bolt Length (on page 415)
Stud Bolt Length Calculation Tolerance (on page 421)

Calculation Prog IDs

The **Calculation Prog IDs** node defines the wall thickness and branch reinforcement calculation programs that the software is to use for a design standard.

Design Standard (Required)

Select the design standard for which to assign calculation programs.

Wall Thickness Prog ID (Required)

Specify the Prog ID of the program to use to calculate the wall thickness for this design standard. For more information, see the *Calculation Logic Reference*.

Branch Reinforcement Prog ID (Required)

Specify the Prog ID of the program to use to calculate the branch reinforcement for this design standard.

See Also
Model Rules (on page 146)

Cap Screw Length Calculation Tolerance

The **Cap Screw Len Cal Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the cap screw length. This node contains all the default values that the software is to use.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit

indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance to use for the bolt length calculation based on the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

Commodity Code Rules

The **Commodity Code Rules** node defines the commodity code default selection rules used by the *Select Commodity Code Dialog Box* (on page 141). This node contains all the default values that the software is to use. There are two nodes for the commodity code defaults, one for the contractor commodity codes and one for the industry commodity codes.

If you do not have anything in your Commodity Code Rules node, you can load two workbooks to use as a starting point. These workbooks are delivered in the *[Product Folder]*\CatalogData\PDSTranslator\Bin folder and are named *Contractor Commdity Code Rule.xls* and *Industry Commodity Code Rule.xls*. For more information about loading the workbooks, see *Piping Specifications Tab (Options Dialog Box)* (on page 974).

Formats

Each of the formats nodes defines the property, order of the properties, and the number of characters used to represent the property in the commodity code. Each commodity type (bolts, flanges, valves, and so forth) can have different format defined for them.

Sequence

Displays the sequence of the properties in the commodity code. Use the **Move Up** ⬆ and **Move Down** ⬇ commands on the ribbon to change the order of the properties in the commodity code.

Property

Select the property to include in the commodity code.

Number of Characters

Specify the number of characters in the commodity code to use to represent the property.

Properties

Defines the commodity code characters for each of the commodity properties.

Value

Select the property value for which to define commodity code characters.

Code

Enter the characters to use in the commodity code to represent this property value. You cannot assign the same characters to more than one property value. Each property value must have its own unique commodity code characters.

See Also
Model Rules (on page 146)
Select Commodity Code Dialog Box (on page 141)
Piping Specifications Tab (Options Dialog Box) (on page 974)
Define Commodity Code Rules (on page 154)

Default Change of Direction

The **Default Change of Direction Rule** node defines the default boundaries for change-of-direction fittings during automatic placement. This rule contains all the default values that the software is to use in the piping specification. You can define exceptions for a particular piping materials class in the *Default Change of Direction Per Spec* (on page 397).

Bend Angle From (Required)

Specifies the lower boundary for the bend angle. This value must match the **Bend Angle To** value on the previous row.

Bend Angle To (Required)

Specifies the upper boundary for the bend angle. This value must match the **Bend Angle From** value for the next row.

Functional Short Code (Required)

Specifies the functional short code to use to access the piping commodity filter for the change-of- direction fitting.

NOTE Functional short codes for change-of-direction fittings are defined here, not on the *Piping Commodity Filter* (on page 385).

Default Piping Commodity Selection Rule

The **Default Piping Commodity Selection Rule** node defines which short code should be used during the automatic placement of fittings. This rule is used when the Commodity Option in the *Piping Commodity Filter* (on page 385) is set to Default.

This rule is also used to connect incompatible ports. When routing, if the ports are not compatible according to the mating port table or because of different NPD, the software looks in this table to find a rule to connect the incompatible ports. For example, you could define that the software use a Flange for a Male Welded against Bolted Connector.

NOTE The functional short codes (generic short codes) for change-of-direction fittings are specified in *Default Change of Direction* (on page 468).

Feature Type (Required)

Specifies the feature type. Feature types are defined in the **Feature Type** select list.

Generic Short Code (Required)

Specifies the short code to use for the defined feature type.

End Preparation Compatibility Exceptions Rule

The **End Preparation Compatibility Exceptions Rule** node is an optional rule that enables the specification writer to define the exceptions to the End Preparation Compatibility Rule, which is used to determine the compatibility of the end preparation of two mating ends by considering the end standard or the materials category of the applicable fittings. The rule is broadly classified into three categories. The first category is used when the fabricator modifies the pipe stock to assemble in special situations. The second category is used when two ends need to be joined by a connector like nipple for example, and the third category is used when two ends are to be made compatible or incompatible conditionally.

For example, if the End Preparation Compatibility Rule considers end preparation A incompatible with end preparation B, the specification writer can use the End Preparation Compatibility Exceptions Rule to define an exception whereby the two end preparations are considered *compatible* when the end standard and/or the materials category of both ends are considered. The converse of this example is also true.

As a basis of the rule, the specification writer identifies the paired list of **End Preparation**, **End Standard**, and **Materials Category** values that are compatible (or *not* compatible) with other specific **End Preparation**, **End Standard,** and **Materials Category** values.

Specifically, this rule can assert one of the following:

- **Carbon steel raised face flanged ends are *compatible* with stainless steel flat face flanged ends** - If the End Preparation Compatibility Rule specifies that raised face flanged ends are *compatible* with flat face flanged ends, the exceptions are interpreted as combinations of **End Standard** or **Materials Category** values that are *incompatible*.

- **Carbon steel raised face flanged ends are *incompatible* with cast iron, ductile iron, and plastic flat face flanged ends** - Conversely, if the End Preparation Compatibility Rule specifies that raised face flanged ends are *incompatible* with flat face flanged ends, the exceptions are interpreted as combinations of **End Standard** or **Materials Category** values that are *compatible*.

NOTE Based solely on end preparation, butt welded steel pipe is compatible with polypropylene pipe. However, from an engineering standpoint, these pipes cannot be welded together, but would be joined by a flanged pair.

End Preparation End A (Required)

Define the end preparation, such as **Small-Groove-Face Lap-Flanged End,** for the port applicable to fitting A.

Termination Subclass End A (Required)

Define the termination sub-class, for example **Flanged**, for the port applicable to fitting A.

Termination Class End A (Required)

Define the termination class, such as **Bolted**, for the port applicable to fitting A.

End Standard End A (Optional)

Define the end standard applicable to the end of fitting A. This property is optional if you define a value for **Materials Category End A**. If you define **End Standard End A**, you do not need to define the **Material Category End A** property.

End Practice End A (Optional)

Define the end practice, such as **U.S. Practice**, for the end of fitting A.**Materials Category Fitting A** (Optional)

Define the classification for the materials grade applicable to fitting A. For example, you can use this property to indicate that metallic piping is not to be welded to plastic piping. This property is ignored if you define a value for **End Standard End A**.

Materials Practice Fitting A (Optional)

Define the industry practice, such as **U.S. Practice**, for the materials grade applicable to fitting A.

End Preparation End B (Required)

Define the end preparation, such as **Small-Groove-Face Lap-Flanged End**, for the port applicable to fitting B.

Termination Subclass End B (Required)

Define the termination sub-class, for example **Flanged**, for the port applicable to fitting B.

Termination Class End B (Required)

Define the termination class, such as **Bolted**, for the port applicable to fitting B.

End Standard End B (Optional)

Define the end standard applicable to the end of fitting B. This property is optional if you define a value for **Materials Category, End B**.

End Practice End B (Optional)

Define the end practice, such as **U.S. Practice**, for the end of fitting B.**Materials Category Fitting B** (Optional)

Define the classification for the materials grade applicable to fitting B. This property is optional if you define a value for **End Standard, End B**.

Materials Practice Fitting B (Optional)

Define the industry practice, such as **U.S. Practice**,   for the materials grade applicable to fitting B.

Lining Material Fitting A (Optional)

Define the type of lining material, if applicable, to fitting A. Examples include cement-mortar, concrete, epoxy, rubber, or plastic lining.

Lining Requirement Fitting A (Optional)

Define the requirement for lining, if applicable, to fitting A.

Lining Material Fitting B (Optional)

Define the type of lining material, if applicable, to fitting B.

Lining Requirement Fitting B (Optional)

Define the requirement for lining, if applicable, to fitting B.

🗏 NOTE You can define **Lining Requirement** without defining **Lining Material**.

Selection Basis per Piping Commodity Filter (Optional)

Specify whether the **Selection Basis** property from the Piping Commodity Filter is to be used to determine whether the two applicable mating ends are compatible. Acceptable values are listed below.

- **Not applicable**

- **Pipe stock to be threaded at one plain end** - Indicates that one end of the plain end pipe stock is to be threaded, becoming a male-threaded end, and should be considered compatible with a female-threaded end. For example, in some situations for pipe stock, one plain end of the pipe stock, which is incompatible with female-threaded fittings, is threaded during the fabrication process.

    ☰ NOTE It is recommended that the material description include an embedded label to extract the value of the **Commodity Option** property from the 3D model. If the value equals the numeric equivalent of a specific value, such as **Plain end x Male threaded end** or **Male threaded end x Plain end**, then text, such as **Pipe to be threaded at one end**, should be appended to the end of the material description.

- **Pipe stock to be beveled at one male threaded end** - Indicates that one end of the male-threaded end pipe stock is to be beveled to create a welded joint. For example, in some situations for pipe stock, one male-threaded end of the pipe stock, which is incompatible with beveled fittings, is beveled during the fabrication process to create a weld.

    ☰ NOTES

    - The software creates a weld at this joint even though the pipe end at this joint is not a welded end with respect to the piping commodity class data.

    - It is recommended that the material descriptions include an embedded label to extract the value of the **Commodity Option** property from the 3D model. If the value equals the numeric equivalent of a specific value, such as **Male threaded end x Beveled end** or **Beveled end x Male threaded end**, then text, such as **Pipe to be beveled at one end**, should be appended to the end of the material description.

- **Pipe stock to be grooved at one plain end** - Indicates that one end of the plain end pipe stock is to be grooved to create a mechanical joint. For example, in some situations for pipe stock, one plain end of the pipe stock, which is incompatible with mechanical ends, is grooved at the fabrication site to be used to form a mechanical joint for a clamp.

    ☰ NOTES

    - The software creates a clamp at this joint even though the pipe end at this joint is not a mechanical end with respect to the piping commodity class data.

    - It is recommended that the material description include an embedded label to extract the value of the **Commodity Option** property from the 3D model. If the value equals the numeric equivalent of a specific value, such as **Plain end x Grooved end** or **Grooved end x Plain end**, then append text to the end of the material description. For example, if the value is something like **Plain end x Grooved end** or **Grooved end x Plain end,** append **Pipe to be grooved at one end** to the end of the material description.

- **Pipe stock push-on bell end to be cut as plain end** - For quick installation and sealing, the manufacturer provides plastic pipe stock, such as fiberglass pipe, as Plain End x Push-on Bell End with a purchase length as, for example, 10', and the corresponding fittings as female Socket End. When the pipe stock is connected to pipe

stock on the construction site, construction personnel can quickly connect and seal the pipe stock. However, in situations where it is necessary to connect fitting-pipe-fitting, the construction worker cuts the Push-on Bell End of the plastic pipe stock as plain end, and inserts the cut pipe between two fittings.

★ IMPORTANT The following data is required to describe the exceptions to end preparation compatibility on the basis of the piping specification.

Joint Requirement (Conditionally Required)

Specify whether the two applicable mating ends are compatible. Acceptable values are listed below.

- **Ends are compatible** - Indicates that the two ends are compatible. If no value is specified, the software considers this the default value.

- **Coupling, connector, or adapter is required for joint** - Indicates that the two ends must be joined by a coupling, connector, or adapter.

- **Nipple is required for joint** - Indicates that the two ends must be joined by a nipple if the male end represents a fitting. For example, plain end or beveled end of pipe is compatible with a socket-welded fitting. However, a plain end fitting or a beveled end fitting should not be joined directly to a socket-welded fitting. In some cases, such as GRE fittings, a nipple or coupling may need to be inserted between the branch fitting and the first reducing fitting at branch. Likewise, a nipple or coupling may need to be inserted between the first reducing fitting and the second reducing fitting and/or between the second reducing fitting and the third reducing fitting.

- **Minimum length pipe is required for joint** - Indicates that the two ends must be joined by minimum pipe length if the male end represents a fitting. For example, plain end and beveled end pipe is compatible with a socket-welded fitting. However, a plain end fitting or a beveled end fitting should not be joined directly to a socket-welded fitting.

Coupling or connector short code (Required)

Enter the short code for the coupling, connector, or adapter that is required to form the joint.

Option category for coupling or connector (Conditionally Required)

Define the categorization of the commodity option.

End Preparation Compatibility Rule

You use the **End Preparation Compatibility Rule** node in the Catalog tree view to define the rules of compatibility for the end preparation of two mating ends.

EndPrep1

Specify the first end preparation code for which you want to define a mating port. Valid end preparation codes are listed in the **End Preparation** select list.

EndPrep2

Specify the second end preparation code for which you want to define a mating port. Valid end preparation codes are listed in the **End Preparation** select list.

🗐 NOTE The **End Preparation Compatibility Rule** node in the **Catalog** task defines the same rules as does the **Mating Ports** sheet in the **Piping Specification.xls** workbook. For more information about the Piping workbooks delivered with the software, see the *Piping Reference Data Guide,* available with the **Help > Printable Guides** command in the software.

Field Fit Length

The **Field Fit Length** node defines the extra length of pipe to add for field fit welding. This rule only applies to field fit welds and not to shop welds or field welds. If, for a field fit weld, no matching criteria is defined in this rule, the software reports an error and the field fit welded connection is not created. The extra length is not shown graphically in the model but will cause an increase in the reported pipe lengths.

Although **Weld Type** is used to select which field fit length is used from this rule, the field fit length is only applied to the pipe cut length calculation when the **Weld Class** is set to "By Pipe Erector, Field Fit" or "By Pipe Erector for Loose Material."

Construction Requirements End 1 (Required)

> Type the construction requirement codelist value for end 1.

Construction Requirements End 2 (Required)

> Type the construction requirement codelist value for end 2.

Field Fit Length (Required)

> Specify the field fit length to use when computing the cut length of plain piping for the defined weld type, diameter, and construction requirements. Include the units of measurement, in or mm for example, when defining this value. The length is annotated as A in the figure.

Nominal Piping Diameter From (Required)

> Specify the lower diameter bound for which the field fit length applies.

Nominal Piping Diameter To (Required)

> Specify the upper diameter bound for which the field fit length applies.

Nominal Piping Diameter Units (Required)

> Specify the units of measurement, for example in or mm, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Weld Class

> Select the weld class for which you want to define a field fit length.

Weld Type (Required)

> Select the weld type for which you want to define a field fit length.

See Also

Flared Pipe

The **Flared Pipe Rule** node defines the lap length and lap thickness for flared pipes based on the nominal piping diameter and the schedule thickness. This rule causes an increase in the reported pipe lengths to account for the installation method. This sheet contains all the default values that the software is to use in the piping specification.

This rule only applies to pipe that is flared by the fabrication shop, not to flared pipe spools that can be purchased from a manufacturer.

This rule is used when you set the **Selection Basis** option to either "Continuous pipe bend flared" or "Plain piping ends flared" in the **Piping Commodity Filter**. Also, flared pipe is determined by a lap joint flange at the pipe end, where the lap joint flange is recognized by the Piping Commodity Subclass of "Lap Joint Flanges". If the lap joint flange has not been associated with a stub end as a reportable piping commodity in the piping commodity filter, the software assumes that the lap flange is being used with flared pipe.

Lap Length (Required)

Specify the extra length to add to the pipe. This extra length is used to form the flared lip and is similar to a field fit in that the pipe length delivered to the field is longer than the dimension on the isometric drawing. The **Lap Length** is annotated as A in the figure.
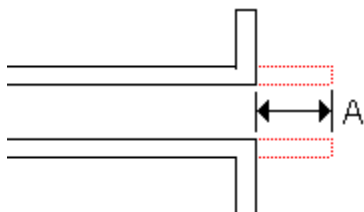
Lap Thickness (Required)

Specify the thickness of the flared lip. This value is added to the flange thickness, and the sum thickness is used in the display of the joint in the model.

Minimum Grip Length

Specify the minimum grip length needed by the machine that will be flaring the pipe.

Nominal Piping Diameter (Required)

Specify the pipe diameter for which the flared pipe information applies.

Nominal Piping Diameter Units (Required)

Specify the unit of measurement, **in** or **mm** for example, for the value in the **Nominal Piping Diameter** column.

Schedule Thickness (Optional)

Type the schedule thickness short description for the pipe.

Schedule Thickness Practice (Optional)

Select the schedule thickness practice for the pipe.

Fluid Density Rule

The **Fluid Density Rule** node defines fluid density based on a defined temperature range. The fluid density is necessary for the software to calculate the fluid weight in a pipe or fitting. For cryogenic liquids and compounds that can change phases, you must define a different fluid code, and thus a different density, for each of the different phases.

Density (Required)

Specify the density of the fluid for the temperature range that you specified. Include the units of measurement, for example **lbm/ft^3** or **kg/m^3**, for the density.

Fluid Code (Required)

Type the short description of the fluid code for which you want to define density.

Temperature From (Required)

Specify the lower temperature bound for which the density applies. Include the temperature unit, for example **F** or **C**, when defining this value.

Temperature To (Required)

Specify the upper temperature bound for which the density applies. Include the temperature unit, for example **F** or **C**, when defining this value.

Gasket Commodity Code Substitution Rule

The **Gasket Commodity Code Substitution Rule** node is an optional rule that you can use to define a gasket's commodity code using the dimensional characteristics of the gasket. This optional rule applies to all gasket types.

This rule is used when the material control system requires the gasket commodity code to serve as a part number that reflects the gasket diameter and the gasket thickness. The gasket's commodity code used in the Piping Specification does not include the gasket diameter and the gasket thickness because those values are not known until the bolted joint is placed in the 3D model. This rule updates the commodity code of the gasket in the model to reflect the gasket diameter and the gasket thickness.

Material Control System Commodity Code (Required)

Enter the commodity code to use for the material control system. This commodity code is not used to query the piping commodity material data for the gasket part.

Gasket Inside Diameter (Required)

Specify the diameter of the gasket in **in** or **mm**.

Gasket Outside Diameter (Required)

Specify the diameter of the gasket in **in** or **mm**.

Gasket Thickness for Procurement (Required)

Specify the thickness of the gasket in **in** or **mm**.

Ring Number (Optional)

Specify the ring number for a ring joint gasket. This property is only required when the

gasket's commodity code does not address the ring number. This is not required for any other type of gasket.

Contractor Commodity Code (Required)

Enter the commodity code for the bolt (or the substitution cap screw) as defined in the *Bolt Selection Filter* (on page 375).

Gasket Selection Filter for Nozzles

The **Gasket Selection Filter For Nozzles** node defines data for any nozzle that requires special gaskets, for example, the nozzle gasket is supplied by the equipment vendor. The special gaskets for nozzles are selected from the Piping Specification by the equipment and nozzle tag numbers. It is only necessary to define this data for those few nozzles that require special gaskets. You do not have to create data for every nozzle in the project.

Gasket Requirements (Optional)

Select the gasket requirement.

Contractor Commodity Code (Required)

Type the contractor commodity code, which identifies the gasket that you want to use from *Gasket Part Data Sheet* (on page 309).

Equipment Tag Number (Required)

Specify the model-wide unique identification name of the process equipment.

Fabrication Category (Optional)

Type the fabrication code that represents the responsibility for fabrication or erection.

Fabrication Requirement (Optional)

Select the fabrication requirement.

Nozzle Tag Number (Required)

Specify the unique identification for the nozzle located on the equipment defined in **Equipment Tag Number**.

Ring Number (Optional)

Specify the ring number for a ring joint gasket. This property is optional and is only required when the gasket's commodity code does not address the ring number. This is not required for any other type of gasket.

Supply Responsibility (Optional)

Specify the supply responsibility code. The supply responsibility code identifies the party responsible for supplying the commodity.

See Also

Machine Bolt Length Calculation Tolerance

The **Machine Bolt Length Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the machine bolt length. This sheet contains all the default values that the software is to use.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance to use for the bolt length calculation based on the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

Material Description Rule

The **Material Description Rule** node defines how the Material Description (Short Material Description) and the Material Specification (Long Material Description) for piping commodities, stock piping specialties, and stock instruments in the piping commodity material control data are created automatically. This rule is triggered by the **Create material description by rule** option. The option is located in the **Catalog** task, **Tools > Options** dialog box, on the **Piping Specifications** tab.

When the **Create material description by rule** option is selected, values for the Material Description (Short Material Description) and optionally the Material Specification (Long Material Description) are created automatically when the Contractor Commodity Code or the Industry Commodity Code is created using the **Select Commodity Code** dialog box in the **Catalog** task. The Material Description (Short Material Description) and optionally the Material Specification (Long Material Description) are created based on the Piping Component Type and the Termination Class.

⧉ NOTE If you define a rule that goes to the subclass level for the selected Piping Component Class, then you need to define the rules for all the subclasses in that selected Piping component Class. You cannot define some higher level rules and some detailed rules for the same Piping Component Class.

Piping Component Type (Optional)

Specify the commodity type for which you are defining a material description.

Piping Component Sub Class (Optional)

Select the piping commodity sub class.

Piping Component Class (Required)

Select the piping commodity class.

Termination Class (Optional)

Specify the termination class for which you are defining the material description.

Short Label (Required)

Enter the text for the Material Description (Short Material Description) for the piping commodity, stock piping specialty, or stock instrument.

Long Label (Optional)

Enter the text for the Material Specification (Long Material Description) for the piping commodity, stock piping specialty, or stock instrument.

See Also
Model Rules (on page 146)

Materials Data

The **Materials Data Rule** node defines the materials data required in the calculation of piping wall thickness.

Allowable Stress (Required)

Specify the basic allowable stress for the material, excluding the casting, joint, or structural grade quality factor (E) to use in the wall thickness calculations.

Coefficient Y (Required)

Type the coefficient Y that you want to use in the wall thickness calculations.

Design Standard (Required)

Type the design standard code that you want to use to calculate the piping wall thickness.

Material Grade (Required)

Type the material grade code.

Mill Tolerance Percentage (Required)

Specify the mill tolerance as a percentage of the nominal thickness to use in the wall thickness calculations. If you enter a value here, do not enter a value for **Mill Tolerance**.

Mill Tolerance (Required)

Specify the mill tolerance to use in the wall thickness calculations. If you enter a value here, do not enter a value for **Mill Tolerance Percentage**.

Temperature (Required)

Specify the temperature for which the materials data applies. Include the unit of measure, **F** or **K** for example, when defining this value.

Wall Thickness From (Optional)

Specify the wall thickness lower bound for which the materials data applies.

Wall Thickness To (Optional)

Specify the wall thickness upper bound for which the materials data applies.

Minimum Pipe Length Rule for Purchase Length Pipe

The **Minimum Pipe Length Rule for Purchase Length Pipe** node defines the minimum pipe length and the preferred minimum pipe length for piping that is only available for purchase in fixed lengths. You define these minimum lengths based on the nominal piping diameter.

The length information defined here should be considered design rules for placing piping in the model. The actual minimum length of pipe that can be purchased is defined at the pipe stock part level in the **Minimum Pipe Length** box (each pipe part has its own minimum pipe length as part of its definition).

Nominal Piping Diameter (Required)

Type the nominal diameter for which the minimum pipe length applies.

Nominal Piping Diameter Units (Required)

Specify the units for the nominal pipe diameter value you entered in the **Nominal Piping Diameter** column. For example, type **mm** or **in**.

Purchase Length (Required)

Specify the purchase length for the piping for which the minimum pipe length applies.

Minimum Pipe Length (Required)

Type the minimum length for the pipe that you want to allow for this nominal diameter. The software will not let you place pipe shorter than this value. Be sure to include the units, for example, **0.5in** or **1.375mm**.

Preferred Minimum Pipe Length (Required)

Type the preferred minimum pipe length for this nominal diameter. Be sure to include the units, for example, **0.5in** or **1.375mm**. The software generates a warning that results in an inconsistency when you place pipe shorter than this value, but does not prevent placement of the pipe.

📝 **NOTE** The value in the **Minimum Pipe Length** column should be less than the preferred minimum pipe length that you enter here.

Minimum Pipe Length Rule for Random Length Pipe

The **Minimum Pipe Length Rule for Random Length Pipe** node defines the minimum pipe length and the preferred minimum pipe length for piping that is available for purchase in random lengths. You define these minimum lengths based on the nominal piping diameter.

The software assumes that the minimum pipe length value includes any length required to address socket depth for socket weld configurations. For example, you intend to insert pipe stock between two socket weld valves, where the socket depth is ½ inch. The minimum pipe length between the two female hubs is to be 2 inch. You must create the minimum pipe length in this rule as 3 inches, 2 + ½ + ½ = 3.

Nominal Piping Diameter (Required)

Type the nominal diameter for which the minimum pipe length applies.

Nominal Piping Diameter Units (Required)

Specify the units for the nominal pipe diameter value you entered in the **Nominal Piping Diameter** column. For example, type **mm** or **in**.

Minimum Pipe Length (Required)

Type the minimum length for the pipe that you want to allow for this nominal diameter. The software will not let you place pipe shorter than this value. Be sure to include the units, for example, **0.5in** or **1.375mm**.

Preferred Minimum Pipe Length (Required)

Type the preferred minimum pipe length for this nominal diameter. Be sure to include the units, for example, **0.5in** or **1.375mm**. The software generates a warning that results in an inconsistency when you place pipe shorter than this value, but does not prevent placement of the pipe.

📝 **NOTE** The value in the **Minimum Pipe Length** column should be less than the preferred minimum pipe length that you enter here.

Nominal Piping Diameter Compatibility Exceptions Rule

The **Nominal Piping Diameter Compatibility Exceptions Rule** node is an optional rule that defines nominal piping diameter (NPD) values that are considered compatible to the extent that two ends can be joined without placing an additional size change component between them, such as a size change fitting or a specification transition adapter. For example, a 100mm ductile iron valve may be joined to a metallic flange adapter for a HDPE backup ring, where the nominal size has been based on the outside diameter (OD) of 110mm.

In addition to being able to successfully butt weld pipes of identical OD and wall thickness, an automatic pipe welder can join 1/4" x 0.049" wall pipe to 3/8" x 0.049" wall pipe or 3/8" x 0.049" wall pipe to 1/2" x 0.065" wall pipe. In some situations, when joining these two different pipe sizes, it is not necessary to use a special adapter. These pipe sizes are considered to be compatible.

The list of compatible pipe sizes is considered to be a function of the materials grade and End Standard.

The list of compatible pipe sizes is selected from the piping specification on the basis of the data listed below.

Nominal Piping Diameter End A (Required)

Define a valid nominal pipe diameter for one end of the applicable joint.

Nominal Piping Diameter Units End A (Required)

Specify the units for the nominal pipe diameter value that you entered in the **Nominal Piping Diameter End A** column. For example, type **mm** or **in**.

Materials Practice End A (Required)

Define the industry practice, such as **U.S. Practice**, for the materials grade of the fitting at one end of the applicable joint.

Materials Category End A (Required)

Define the classification for the materials grade of the fitting at one end of the applicable joint.

Materials Grade End A (Optional)

Define the material grade code for the fitting at one end of the applicable joint. If you define **End Standard End A**, you do not need to define this property.

End Practice End A (Optional)

Define the end practice, such as **Germany Standards (DIN)**, for one end of the applicable joint.

End Standard End A (Optional)

Define the end standard code for one end of the applicable joint. This property is ignored if you define a value for **Materials Grade End A**.

Nominal Piping Diameter End B (Required)

Define a valid nominal pipe diameter for the other end of the applicable joint.

Nominal Piping Diameter Units End B (Required)

Specify the units for the nominal pipe diameter value that you entered in the **Nominal Piping Diameter, End B** column. For example, type **mm** or **in**.

Materials Practice End B (Required)

Define the industry practice, such as **U.S. Practice**, for the materials grade of the fitting at the other end of the applicable joint.

Materials Category End B (Required)

Define the classification for the materials grade of the fitting at the other end of the applicable joint.

Materials Grade End B (Optional)

Define the material grade code for the fitting at the other end of the applicable joint. If you define **End Standard End B**, you do not need to define this property.

End Practice End B (Optional)

Define the end practice, such as **Germany Standards (DIN)**, for one end of the applicable joint.

End Standard End B (Optional)

Define the end standard code for the other end of the applicable joint. This property is ignored if you define a value for **Materials Grade End B**.

Nominal Piping Diameter Equivalence Rule

The **Nominal Piping Diameter Equivalence Rule** defines equivalent nominal piping diameter (NPD) values in two systems of units. The NPD equivalence rules allow piping designers to use multiple systems of units for nominal pipe diameter within a piping materials class. For example, NPD equivalence rules allow piping designers to do the following:

- Use a system of units even if the catalog data is defined using other units.

- Use two systems of units in the same model, piping materials class, and even in the same line.

- Define transition components that have different units of measure at each end.

The software uses these rules to determine equivalent NPDs for querying the piping specification. However, the NPD equivalence rules are not used in the Piping Catalog.

NPD in Primary Units of Measure (Required)

Type a valid nominal pipe diameter for the piping specification in the primary system of units.

Primary Units of Measure (Required)

Specify the units for the nominal pipe diameter value that you entered in the **NPD in Primary Units of Measure** column. For example, type **mm** or **in**.

NPD in Secondary Units of Measure (Required)

Type an equivalent nominal pipe diameter in the secondary system of units. For example, if the primary units of measure are inches and the nominal pipe diameter in the **NPD in Primary Units of Measure** column is 1, then an equivalent value in millimeters is 25.

Secondary Units of Measure (Required)

Specify the units for the nominal pipe diameter value that you entered in the **NPD in Secondary Units of Measure** column. For example, type **mm** or **in**.

Nut Commodity Code Substitution Rule

The **Nut Commodity Code Substitution Rule** node is an optional rule that you can use to define a nut's commodity code using the dimensional characteristics of the nut. This optional rule applies to all nuts.

This rule is used when the material control system requires the nut commodity code to serve as a part number that reflects the bolt diameter. The nut's commodity code used in the Piping Specification does not include the bolt diameter because those values are not known until the bolted joint is placed in the 3D model. This rule updates the commodity code of the bolt set in the model to reflect the bolt length and the bolt diameter.

Material Control System Commodity Code (Required)

Enter the commodity code to use for the material control system. This commodity code is not used to query the piping commodity material data for the bolt part.

Bolt Diameter (Required)

Specify the diameter of the bolt in **in** or **mm**.

Contractor Commodity Code (Required)

Enter the commodity code for the bolt (or the substitution cap screw) as defined in the *Bolt Selection Filter* (on page 375).

Pipe Bend Radius Multiplier Rule

You use the **Piping > Piping Specifications > Model Rules > Pipe Bend Radius Multiplier Rule** node in the Catalog tree view to specify the absolute bend radius value for pipe bends based on the nominal piping diameter and the pipe bend radius multiplier as specified in the piping commodity filter. Specifying the bend radius multiplier independently of the commodity option assumes that the bend radius is the only type of option ever required for change-of-direction fittings.

Nominal Piping Diameter (Required)

Type the nominal pipe diameter for which you want to define bend radii.

Nominal Piping Diameter Units (Required)

Specify the units for the **NPD** column. For example, type **mm** or **in**. If the Nominal Piping Diameter Equivalence rule exists in this Piping Specification, the data for this rule is determined by the nominal piping diameter in the primary system of units, which is represented by the active size defined by the piping designer in the 3D model. Or the data for this rule is determined by of the nominal piping diameter in the secondary system of units, as defined by the Nominal Piping Diameter Equivalence rule, if data has not been defined for the value of nominal piping diameter in the primary system of units.

Pipe Bend Radius Multiplier (Required)

Type the pipe bend radius multiplier for which the absolute pipe bend radius applies.

Absolute Pipe Bend Radius (Required)

Type the absolute radius for a pipe bend.

See Also
Define Allowable Pipe Bend Radii (on page 175)

Pipe Bending Elongation

The **Pipe Bending Elongation Rule** node defines the amount of "stretch" that occurs to the pipe length during the piping bending process. By using this rule, the software can report the correct cut length on the bill-of-materials for the isometric drawing.

Cut length = Calculated cSpecifyline length - Pipe elongation

where:

calculated cSpecifyline length = L1 + L2 - 2.0 × R × Tan (a / 2.0) + R × a
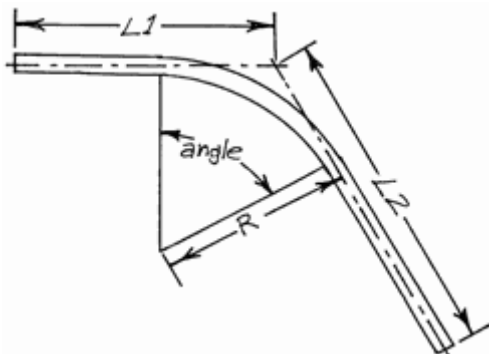
You can define the "stretch" length by doing one of the following:

▪ Specifying the amount of pipe elongation per unit of bend angle for each applicable nominal piping diameter and bend radius.

▪ Specifying the pipe elongation values at a specific bend angle for each applicable nominal piping diameter and bend radius.

▪ Specifying the pipe elongation values using a combination of the two methods. If both methods are defined for a nominal piping diameter and bend radius, the pipe elongation value at a specific bend angle takes precedence and is used.

This sheet contains all the default values that the software is to use in the piping specification. You can define exceptions for a particular piping materials class in the *Pipe Bending Elongation Per Spec* (on page 408) under the Piping Material Class node.

Bend Angle (Required)

Specify the bend angle for which the pipe bending elongation applies.

Nominal Piping Diameter (Required)

Specify the pipe diameter for which the flared pipe information applies.

Nominal Piping Diameter Units (Required)

Specify the unit of measurement, **in** or **mm** for example, for the value in the **Nominal Piping Diameter** column.

Pipe Bend Radius (Required)

Specify the pipe bend radius. Be sure to include the units of measurement when defining this value.

Pipe Elongation (Required)

Specify the elongation value of the plain piping due to the bending process as an absolute

value for a specific bend angle.

Pipe Elongation Unit Bend Angle (Required)

Specify the elongation of the plain piping due to the bending process per unit of bend angle. This value is the factor in th*e foll*owing equation: Elongation = Factor * Bend Angle.

Plate Flange Setback Distance

The **Plate Flange Setback Distance** node defines the setback values for plate flanges based on the nominal piping diameter range.

This rule is used when the flange part's commodity sub class is set to "Plate flanges" or "Reducing Plate flanges".

📄 NOTE Plate flanges with stub ends are not applicable to this rule.

End Preparation (Required)

Type the end preparation code.

Pressure Rating Plate Flange (Optional)

Select the pressure rating for the plate flange. You must select a **Rating Practice** before you can make a selection here.

Materials Category (Required)

Define the classification for the materials grade of the plant flange.

Nominal Piping Diameter From (Required)

Specifies the pipe diameter lower bound for which the setback distance applies.

Nominal Piping Diameter To (Required)

Specifies the pipe diameter upper bound for which the setback distance applies.

Nominal Piping Diameter Units (Required)

Specifies the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Setback Distance (Required)

Type the setback distance. Include the units of measurement, **in** or **mm** for example, when defining this value.

Rating Practice (Optional)

Select the pressure rating practice.

Port Alignment

The **Port Alignment Rule** node defines the allowable joint deflection. This rule is used:

- When a branch connects to a sloped header. Should the branch be trimmed by adding more weld material or by trimming the branch end?

- To provide flexibility in male/female mechanical connections such as underground bell and spigot.

- To trim the welded end of a flange at a nozzle to align with a sloped pipe.

This sheet contains all the default values that the software is to use in the piping specification. You can define exceptions for a particular piping materials class in the *Port Alignment Per Spec* (on page 412) under the Piping Materials Class Rules node.

Acceptable Alignment Tolerance (Required)

Specify the maximum angular variation. This may be between the branch centerline and the header centerline, between the bell and spigot, or between the flange and the nozzle. Be sure to include the unit of measurement when defining this value, for example, **1.5deg**.

End Preparation (Required)

Define the end preparation for the port alignment being defined.

Method of Trimming (Required)

Define the method of trimming.

Nominal Piping Diameter From (Optional)

Specify the pipe diameter lower bound for which the port alignment applies.

Nominal Piping Diameter To (Optional)

Specify the pipe diameter upper bound for which the port alignment applies.

Nominal Piping Diameter Units (Optional)

Specify the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Preferred Cap Screw Length

The **Preferred Cap Screw Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Cap Screw Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

🗐 NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

Preferred Machine Bolt Length

The **Preferred Mach Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Machine Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

NOTES
- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.
- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Preferred Stud Bolt Length

The **Preferred Stud Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This sheet contains all the default values that the software is to use.

This rule is used when the **Stud Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred bolt lengths".

📝 NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Preferred Tap End Stud Bolt Length Rule

The **Preferred Tap End Stud Bolt Length Rule** node specifies the list of available purchased, or preferred, bolt lengths, as a function of the bolt diameter and the bolt material grade. This rule contains all the default values that the software is to use.

This rule is used when the **Tap End Stud Bolt Length Round Off Option** in **Model Options** is set to "Use list of preferred tap end stud bolt lengths".

NOTES

- If you use this preferred bolt lengths list, the software rounds the computed bolt length up to the smallest preferred bolt length in this list that exceeds the computed bolt length.

- The software applies a 0.0001" tolerance to the computed bolt length when selecting a preferred bolt length. For example, if the computed bolt length is 2.75001", the preferred bolt length selected is 2.75", not 3.00".

Bolt Diameter From (Required)

Type the bolt diameter lower bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter To (Required)

Type the bolt diameter upper bounds for which to specify a preferred length. Be sure to include the units, for example, **0.5in** or **1.375in**.

Bolt Diameter Increment (Required)

Type the value by which to increment the bolt diameter. Be sure to include the units, for example, **0.5in** or **1.375in**.

Material Grade (Required)

Type the material grade code for the bolt.

Preferred Bolt Length From (Required)

Type the preferred bolt length lower bound for this bolt diameter and material grade.

Preferred Bolt Length To (Required)

Type the preferred bolt length upper bound for this bolt diameter and material grade.

Preferred Bolt Length Increment (Required)

Type the value by which to increment the preferred bolt length.

See Also

Root Gap Rule

The **Root Gap Rule** node is an optional rule that defines the root gap to apply to the weld between the header pipe and an olet-type branch, or between an elbow and an elbolet. You can define exceptions for a particular piping materials class in the *Root Gap Per Spec* (on page 419).

Nominal Piping Diameter From (Optional)

Define the lower bound of the header's largest nominal piping diameter for which this root gap applies.

Nominal Piping Diameter To (Optional)

Define the upper bound of the header's largest nominal piping diameter for which this root gap applies.

Nominal Piping Diameter Units (Optional)

Specify the units for the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Root Gap (Required)

Specify the root gap to use for the nominal piping diameter range. Be sure to include the units of measure when specifying this value.

Short Code Hierarchy Rule

The **Short Code Hierarchy Rule** node designates which short codes are exposed to the piping designer under which configurations. More importantly, the short code also controls the behavior of the component when the component is inserted in the pipe run. It is very important that the short code be assigned to the correct short code hierarchy type in this rule. You can specify short codes for short code hierarchy types defined in the **Short Code Hierarchy Type** select list.

For a component having...	The Short Code Hierarchy Class/Type in the spec rule should be...	The Resulting Route Feature Type is...
One Port	Inline Fittings/Closing Fittings	End feature
Two ports with change in direction	Change Of Direction Fittings/*	Turn feature
Two inline ports having different NPD (with and without offset).	Inline Fittings/Concentric Size Change Fittings Inline Fittings/Eccentric Size Change Fittings	Intermediate end feature
Two inline ports with same NPD (with and without offset).	Inline Fittings/Valves Inline Fittings/Flanges Inline Fittings/Other Inline Fittings	Along-leg feature

For a component having...	The Short Code Hierarchy Class/Type in the spec rule should be...	The Resulting Route Feature Type is...
Components having three ports with two inline ports and one offline port and all ports intersect at the symbol origin.	Branches/Tee Type Branches	Along-leg branch parent feature
Components having three or more ports with at least two inline ports. If three port component then all ports do not intersect at the symbol origin.	Inline Fittings/Other Inline Fittings Branches/Other Branches	Along-leg feature
Components having more than two ports with only one inline port.	Miscellaneous Fittings/Miscellaneous	Along-leg end-leg feature
Components having four ports where two ports are inline and all ports intersect at the symbol origin.	Branches/Cross Branches	Along-leg feature

Short Code Hierarchy Type (Required)

Specify the short code hierarchy type for which you want the short code to appear in the software. You can define new short code hierarchy types in the **Short Code Hierarchy Type** select list.

Short Code (Required)

Type the short code that you want to associate with the hierarchy type you defined in the **Short Code Hierarchy Type** column. A short code is used as a grouping or designation for each component so you can select the component. Some examples of short codes that you might use are: Piping, Nipple, Gate Valve, Lift Check Valve, Tee and Weld Neck Flange.

TIP When displaying the short codes in the **Piping** task, the software queries the reference data separately for the different short code hierarchy types that can be inserted, such as inline fittings, end fitting, branch fittings and size change. The software then concatenates the multiple lists into one list to display in the Type box on the ribbon. For improved usability, be sure to keep the short codes in alphabetically order within each short code hierarchy type.

Size Reduction Rule

The **Size Reduction Rule** node is an optional rule that defines the permissible size reductions for both concentric and eccentric reducers. For example, you might define rules that a 8"X4" size reduction is to use a single 8"X4" reducer, while a 6"X2" size reduction is to use a 6"X4" reducer and a 4"X2" reducer. You can also specify your preference for a size reduction when more than one solution is available. You can define exceptions for a particular piping materials class in the *Size Reduction Per Spec* (on page 420).

First Size (Required)

Enter the first size of the size reduction to define.

First Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **First Size** column.

Fitting 2 First Size (Required)

Enter the first size for the second reduction fitting.

Fitting 2 First Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 2 First Size** column.

Fitting 3 First Size (Optional)

Enter the first size for the third reduction fitting.

Fitting 3 First Size Units (Optional)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 3 First Size** column.

Fitting 4 First Size (Optional)

Enter the first size for the four reduction fitting.

Fitting 4 First Size Units (Optional)

Enter the units, **mm** or **in** for example, for the value you entered in the **Fitting 4 First Size** column.

Size Reduction Type (Required)

Enter a **1** if the size reduction rule you are defining is for concentric reducers. Enter a **2** if the size reduction rule is for eccentric reducers.

Size Reduction Preference (Optional)

Enter a number between 1 and 4 to indicate your solution preference order when more than one size reduction solution is defined. For example, a 24"x6" reduction can be done using a 24"x14" and a 14"x6", using a 24"x12" and a 12"x6", or using a 24"x10" and a 10"x6". Enter **1** as the default preference, enter **2** for your second choice, and so on.

Second Size (Required)

Enter the second size of the size reduction to define.

Second Size Units (Required)

Enter the units, **mm** or **in** for example, for the value you entered in the **Second Size** column.

Slip-on Flange Setback Distance

The **Slip On Flange Setback Distance Rule** node defines the values needed to calculate the distance that the end of the pipe is inserted into the slip-on flange. The software computes this setback distance (shown as A in the figure) as the sum of the fillet weld size and the company practice gap rounded up by the company practice round off factor. The fillet weld size is equal to the pipe wall thickness, limited by the defined maximum weld thickness.
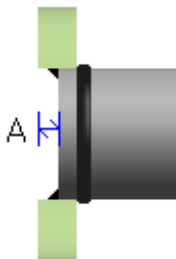
This rule is triggered when the **Commodity Type** for the flange part is set to FSO - Slip-on Flanges or FRSO - Reducing Slip-on Flanges (select list numbers 55, 500, 66, or 600). Commodity types are defined on the **Piping Commodity Type** select list.

Company Practice Gap (Required)

Enter the distance between the flange face and the edge of the interior weld. This distance, gap, is usually established per a company practice. Include the units of measurement, **in** or **mm** for example, when defining this value.

Company Practice Roundoff Factor (Required)

Enter the value to use to round up the sum of the weld thickness and the gap. Include the units of measurement, **in** or **mm** for example, when defining this value.

End Standard (Required)

Type the end standard for the bolted end of the slip-on flange.

Maximum Weld Thickness (Required)

Type the maximum weld thickness. Include the units of measurement, **in** or **mm** for example, when defining this value.

Nominal Piping Diameter From (Required)

Enter the pipe diameter lower bound for which the company practice gap and roundoff factor apply.

Nominal Piping Diameter To (Required)

Enter the pipe diameter upper bound for which the company practice gap and roundoff factor apply.

Nominal Piping Diameter Units (Required)

Enter the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter From** and **Nominal Piping Diameter To** columns.

Socket Offset Rule

The **Socket Offset Rule** node defines the socket offset (expansion gap) for female ends on the basis of the pressure rating (or schedule), end preparation, end standard, and nominal piping diameter of the female end.

Values defined in this rule supersedes any value that may be defined in the *Female End Data* (on page 320) rule unless a value is not defined here, then the Socket Offset value in the Female End Data is used.

End Practice (Required)

Select the end practice for the end.

End Preparation (Required)

Select the end preparation for the end.

End Standard (Required)

Select the end standard for the end.

Nominal Piping Diameter (Required)

Enter the pipe diameter for which the socket offset rule applies.

Nominal Piping Diameter Units (Required)

Enter the unit of measurement, **in** or **mm** for example, for the values in the **Nominal Piping Diameter** column.

Pressure Rating (Conditionally Required)

Define the pressure rating for the socket offset.

Rating Practice (Conditionally Required)

Select the pressure rating practice for the socket offset selection.

Schedule (Conditionally Required)

Select the thickness schedule for the female end. This value is used as the basis of the female end generic data, if the Pressure Rating is undefined. In the case of a circular hole end (for example, the non-bolted end of a slip-on flange), the female end generic data should be specified with undefined values for both Pressure Rating and Schedule.

Schedule Thickness Practice (Conditionally Required)

Select the schedule practice for the female end.

Socket Offset (Required)

Enter the offset of the socket for the female end. Typically, this value is 1/16". Include the units of measure, such as mm or in, when specifying this value.

Termination Class (Required)

Select the termination class code. Options are defined in the End Preparation select list.

Termination Sub Class (Required)

Select the termination subclass code. Options are defined in the End Preparation select list.

Stud Bolt Length Calculation Tolerance

The **Stud Bolt Length Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the stud bolt length. This sheet contains all the default values that the software is to use.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance on the bolt length for the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

See Also

Tap End Stud Bolt Calculation Tolerance Rule

The **Tap End Stud Bolt Calculation Tolerance Rule** node defines the negative or positive tolerance on the bolt length that is used when calculating the tap end stud bolt length. This rule contains all the default values that the software is to use.

Bolt Diameter From (Required)

Type the starting bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Diameter To (Required)

Type the ending bolt diameter for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length From (Required)

Type the starting bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length To (Required)

Type the ending bolt length for the tolerance that you want to define. Include the unit indicator of **in** or **mm**.

Bolt Length Tolerance (Required)

Enter the negative or positive tolerance on the bolt length for the bolt length and bolt diameter ranges that you defined. Include the unit indicator of **in** or **mm**.

See Also

Bolt Length Calculations (on page 308)
Bolt Diameter Equivalence Rule (on page 457)
Bolt Extension (on page 458)
Bolt Selection Filter (on page 375)
Bolt Selection Filter for Nozzles (on page 462)
Machine Bolt Length Calculation Tolerance (on page 403)
Preferred Machine Bolt Length (on page 414)
Preferred Stud Bolt Length (on page 415)
Stud Bolt Length Calculation Tolerance (on page 421)

Washer Commodity Code Substitution Rule

The **Washer Commodity Code Substitution Rule** node is an optional rule that you can use to define a washer's commodity code using the dimensional characteristics of the bolt set it goes with. This optional rule applies to all washers.

This rule is used when the material control system requires the washer commodity code to serve as a part number that reflects the bolt diameter. The washer's commodity code used in the Piping Specification does not include the bolt diameter because those values are not known until the bolted joint is placed in the 3D model. This rule updates the commodity code of the bolt set in the model to reflect the bolt diameter.

Material Control System Commodity Code (Required)

Enter the commodity code to use for the material control system. This commodity code is not used to query the piping commodity material data for the bolt part.

Bolt Diameter (Required)

Specify the diameter of the bolt in **in** or **mm**.

Contractor Commodity Code (Required)

Enter the commodity code for the bolt (or the substitution cap screw) as defined in the *Bolt Selection Filter* (on page 375).

WBS Creation Rule

The **WBS Creation Rule** node defines the default options for the Group Piping Parts command in the **Piping** task.

Rule Name (Required)

Type a name for the WBS automated creation rule.

WBS Grouping (Required)

Specify a grouping type.

Create Exclusive WBS Item (Required)

Specify whether the software should create exclusive WBS items.

Label Name (Optional)

Type the name of the label that defines the query parameters and the naming rule to use in creating the WBS items.

Object Filter Name (Optional)

Select the filter to use to select the piping parts for the WBS item.

Auto WBS Grouping Rule Type (Required)

Select how you want the software to select object for the WBS items.

- **Group by query** - Objects are grouped based upon a query that is defined in a label. For example, use this option to quickly find all pipe parts that belongs to run that are heat traced and then to subgroup them according to other attributes such as sequence number and NPD.

- **Group by query and control point** - Objects are grouped based on queries and control points. By using this method, you can group objects using the query, and then create subgroups using the placement of control points.

- **Group by control point** - Objects are grouped based on control points that you place using the **Insert > Control Point** command. Objects between the control points are grouped together. If you select this option, you will need to define a control point subtype in the **Control Point Subtype** field.

Control Point Subtype (Required)

Select the control point subtype the command is to look for. The control points are used as boundaries to define where one WBS item grouping ends and the next one begins. You place the control points using the **Insert > Control Point** command. Be sure that when you are placing the control points that you select the correct control point subtype.

Maximum Number of Objects (Optional)

Enter the maximum number of objects to put in a WBS item. When this limit is exceeded, the software marks the WBS item as oversized and sends the WBS item to the To Do List. If both assemblies and base parts are being added to the WBS, the assemblies are not included in this count. If only assemblies are being added, then they are included in the count.

Respect Assembly Boundaries (Required)

Specifies whether the boundaries of assembly parents must be honored. For example, if a pipe part belongs to a spool, all parts of the spool must be included in the same WBS item.

(Note: This option is not used in the current software version.)

Pull in Associated Items (Required)

Specifies whether parts related to the pipe parts are included in the WBS item. Examples of these related parts would be gaskets, bolt and nut sets, and welds.

Include Assemblies (Required)

Specifies whether assemblies should be added along with the children. For example, if the query is locating pipe parts, the software checks to see if the part belongs to an assembly (a spool) and, if so, the assembly is added to the WBS item along with the part. (Note: This option is not used in the current software version.)

Ignore Boundaries (Required)

Specifies whether the software extend beyond the query boundaries to find intrinsic breaks. (Note: This option is not used in the current software version.)

Weld Model Representation Rule

The **Weld Model Representation Rule** node specifies rules for displaying welds in the model. It is important that piping designers see field welds in the model in order to optimize the location of the welds for welding machines, scaffolds, and so forth.

Material Grade (Optional)

Type the material grade code for the weld.

Nominal Diameter From (Required)

Define the lower bound of the largest nominal piping diameter for which this weld clearance applies.

Nominal Diameter To (Required)

Define the upper bound of the largest nominal piping diameter for which this weld clearance applies.

Nominal Piping Diameter Units (Required)

Specify the units for the **Nominal Diameter From** and **Nominal Diameter To** columns. For example, type **in** for inches or **mm** for millimeters.

Weld Class (Required)

Type the weld class code.

Weld Radius Increase (Required)

Specify the distance between the outside surface of the pipe and the top of the weld. This distance is shown as Weld Height in the diagram.

Weld Thickness (Required)

Specify the weld thickness.
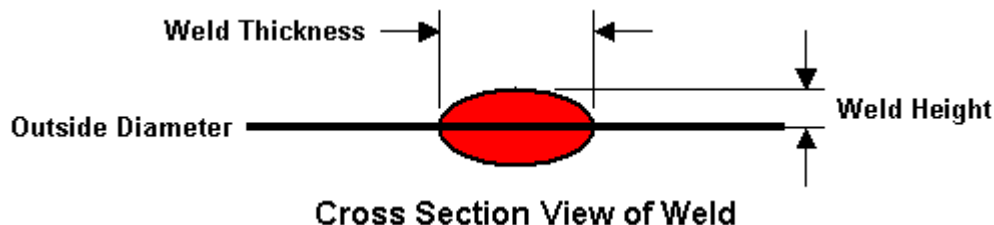
Cross Section View of Weld

See Also
Field Fit Length (on page 398)
Reinforcing Weld Data (on page 418)
Weld Clearance Rule (on page 424)
Weld Gap Rule (on page 425)
Weld Model Representation Rule (on page 499)
Weld Type Rule (on page 500)

Weld Type Rule

The **Weld Type Rule** node specifies the weld type to use based on the fabrication and construction types of the two ends that form the welded joint.

Construction Requirement Of End1 (Required)

Enter the construction requirement code for the first end.

Construction Requirement Of End2 (Required)

Enter the construction requirement code for the second end.

Fabrication Type Of End1 (Required)

Enter the fabrication type code of the first end.

Fabrication Type Of End2 (Required)

Enter the fabrication type code of the second end.

Weld Type (Required)

Enter the weld type code to use.

See Also
Field Fit Length (on page 398)
Reinforcing Weld Data (on page 418)
Weld Clearance Rule (on page 424)
Weld Gap Rule (on page 425)
Weld Model Representation Rule (on page 499)
Weld Type Rule (on page 500)

Valve Operator Material Control Data

The **Valve Operator Material Control Data** node defines the valve operator material control data for the piping specification. This information does not vary per piping materials class.

Alt Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable piping commodity that is to be created with the primary piping commodity on the basis of the piping materials class. In an isometric drawing, only the primary piping commodity is depicted graphically. The materials list includes the short description of both the primary piping commodity and the reportable piping commodity. The data for the reportable piping commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other piping commodity. This data is currently not used by the software.

Hyperlink To Electronic Vendor (Optional)

Type the URL address to the electronic vendor catalog.

Hyperlink To Electronic Manuals (Optional)

Type the URL address to the electronic copy of the manuals.

Localized Short Material Description (Optional)

Type a description for the material. The software uses this description in the bill-of- materials part of isometric drawings when construction personnel require a different language than what was used in the **Short Material Description** box.

Long Material Description (Optional)

Type a description for the material to use when requisitioning.

Operator Part Number (Required)

Type the unique catalog data identification for the valve operator.

Manufacturer (Optional)

Type the code for the manufacturer.

Quantity of Alt Reportable Parts (Optional)

Enter the number of alternate reportable piping commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable Commodity Code** column but do not define a value in this column, the software uses a default value of one. This data is currently not used by the software.

Quantity of Reportable Parts (Optional)

Type an integer value that represents the quantity of objects to be reported per instance of the piping commodity. Typically, this value is one, but the value may be greater than one. This data is currently not used by the software.

Reportable Commodity Code (Optional)

Type the commodity code of the piping specialty item that you want created with the primary commodity code item. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here, or you might want to enter the commodity code for the chain for a chain wheel. This data is currently not used by the software.

Short Material Description (Required)

Type a description for the material. The software uses this description in the bill-of-materials part of isometric drawings, for reporting, and for visual feedback to the piping designer for design, construction, and fabrication.

Valve Operator Type (Required)

Enter the code that represents the specific type of valve operator, actuator, or appurtenance.

Vendor (Optional)

Type the code for the vendor.

See Also
Instrument Class Data (on page 342)
Multiport Valve Operator Data (on page 350)
Piping Commodity Filter (on page 385)
Piping Commodity Material Control Data (on page 356)
Piping Commodity Procurement (on page 363)
Piping Materials Classes (on page 367)
Piping Specialty Class Data (on page 427)
Valve Operator Material Control Data (on page 501)

Tap Properties

The **Tap Properties Data** node defines the taps that you want in your parts catalog.

End Preparation (Required)

Enter the end preparation code for the part port.

End Standard (Required)

Enter the end standard code for the part port.

Flow Direction (Conditionally Required)

Enter the flow direction code for the port. Specifying the correct flow direction code for each part port is very important because the software automatically orients the part to the flow direction of the pipe or port to which the part is connected.

ID (Required)

Type a unique identifying name for the port.

NPD (Required)

Type the nominal piping diameter for the part port. Unless you specify otherwise, the software defines port 1 as the primary port.

NPD Unit Type (Required)

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping Point Basis (Required)

Type the piping point basis code that identifies the function of the port.

Pressure Rating (Conditionally Required)

Enter the pressure rating code for the part port.

Schedule Thickness (Conditionally Required)

Type the schedule thickness short description or code for the part port.

Tap Number (Required)

Type a commodity code for the tap. The software uses this commodity code to find the tap in the catalog. This code must be unique across the catalog.

Termination Class (Required)

Select the termination class for the tap.

Termination Subclass (Required)

Select the termination subclass for the tap.

See Also
Permissible Taps (on page 407)

Valve Operator Parts

The **Piping > Valve Operator Parts** node defines all of the valve operators that are available in the catalog.

The dimensional data varies depending on the operator. In all cases, all dimensional data is required. Review the preview for the operator to determine the location of a dimension on the symbol.

Display Prog ID (Required)

Specifies the symbol to use to display the valve operator, actuator, or accessory in the model. For example, you might enter SP3DOP_331.COP_331 to use the SP3DOP_331 valve operator symbol.

Dry COG X (Optional)

Type the center-of-gravity location for the part along the x-axis when the part is empty.

Dry COG Y (Optional)

Type the center-of-gravity location for the part along the y-axis when the part is empty.

Dry COG Z (Optional)

Type the center-of-gravity location for the part along the z-axis when the part is empty.

Dry Weight (Optional)

Enter the empty weight of the part. Be sure to specify the units when entering this value.

Mirror Behavior Option (Optional)

Specify the mirror behavior of the part.

Part Description (Required)

Enter a description of the part.

Part Number (Required)

Specify the part number. All part numbers must be unique across the entire catalog.

Valve Operator Number (Required)

Specify a unique identification for the valve operator, including the name of the manufacturer and the manufacturer's part number. This is required to uniquely identify the specific valve operator type because the valve's commodity code typically only indicates the generic type of valve operator.

In the case of valve accessories (appurtenances), the valve operator number represents the commodity code of the valve accessory (appurtenance), which is used to determine the commodity code of the valve accessory (appurtenance) being inserted in the model as an associated part.

Valve Operator Is Rotatable (Conditionally Required)

Specify whether the valve operator fixed or can be rotated.

Valve Size (Required)

Enter the valve NPD for which this operator is available.

Valve Size Units (Required)

Enter the units of measurement for the **Valve Size** column. For example, specify **in** or **mm** here.

Water Weight (Optional)

Enter the water weight of the part. Be sure to specify the units when entering this value.

Water COG X (Optional)

Type the center-of-gravity location for the part along the x-axis when the part is filled with water.

Water COG Y (Optional)

Type the center-of-gravity location for the part along the y-axis when the part is filled with water.

Water COG Z (Optional)

Type the center-of-gravity location for the part along the z-axis when the part is filled with water.

Appendix: Equipment

This appendix contains the common properties that you will see when looking at Equipment parts under the main Equipment node in the tree view.

Name

Enter the part number for the equipment part. The keyword **Name** must be respected in the spreadsheet, but it is actually equivalent to the PartNumber. The software uses the part number at placement when the part name is automatically generated. An example is BA106E 42309-1.

⭐ **IMPORTANT** All part numbers must be unique across the entire catalog.

PartDescription

Type a description for the equipment part. An example is Centrifugal Pump, 10" suction, 8" discharge.

MirrorBehaviorOption

Type the mirror behavior code for the horizontal vessel.

ReplacementPartNumber

Specify the replacement part number for the equipment part.

ProcessEqTypes(i)

Type the coded process equipment type for the part. For example, 365 is the equipment type code for a Vertical centrifugal pump.

SymbolDefinition

Type a definition of the Visual Basic symbol you are creating for the equipment part. An example is SP3DVesselwithSkirtAsm.CVesselWSSym.

Definition

Type a definition of the Visual Basic class you are creating for the Custom Assembly Definition for an equipment part. An example is SP3DVesselWSkirt.Asm.CVesselWSDef.

UserClassName

Sets the user name for the part class. You can use this field to give more meaningful names to the user classes, if necessary. This name appears in the Catalog browser.

OccClassName

Sets the occurrence name for the part class. This name appears on the filter dialog boxes in the software.

SymbolIcon

Specifies a graphic file for the part class. You can view this graphic in the **Catalog** task interface or on a Properties dialog box in the software.

Dry COG X

Type the center-of-gravity location for the equipment part along the x-axis when the part is empty.

DryWeight

Enter the empty weight of the part. Be sure to specify the units when entering this value.

WaterWeight

Enter the water weight of the equipment part. Be sure to specify the units when entering this value.

🗐 **NOTE** For Equipment, the Weight and CG property "Wet Weight" is the sum of Dry Weight and Water Weight. The dry weight and water weight values are catalog properties entered on the part sheet for the equipment.

DryCOGY

Type the center-of-gravity location for the equipment part along the y-axis when the part is empty.

DryCOGZ

Type the center-of-gravity location for the equipment part along the z-axis when the part is empty.

WaterCOGX

Type the center-of-gravity location for the equipment part along the x-axis when the part is filled with water.

WaterCOGY

Type the center-of-gravity location for the equipment part along the y-axis when the part is filled with water.

WaterCOGZ

Type the center-of-gravity location for the equipment part along the z-axis when the part is filled with water.

💡 **TIP** For the remaining properties, *(i)* indicates an integer corresponding to a nozzle number assigned to an equipment part. This method avoids a lengthy listing for all possibilities, such as Nozzle(1):EndPrep, Nozzle(2):EndPrep, and Nozzle(3):EndPrep for three possible nozzles. When you type the nozzle properties into the workbook, substitute a number for *(i)* to assign the nozzle to the appropriate property.

Nozzle(i):NPD

Type the nominal piping diameter for the particular nozzle connection. Unless you specify otherwise, the software defines nozzle 1 as the primary nozzle.

Nozzle(i):NPDUnitType

Specify the units for the nominal piping diameter of the nozzle. For example, type **mm** for millimeters or **in** for inches.

Nozzle(i):EndPrep

Type the coded end preparation for the nozzle connection.

Nozzle(i):EndStandard

Type the coded end standard for the nozzle connection.

Nozzle(i):ScheduleThickness

Type the schedule thickness (wall thickness) short description code for the nozzle. If you enter the wall thickness directly, include the units. For example, type **7mm**.

Nozzle(i):PressureRating

Type the coded pressure rating for the nozzle connection.

Nozzle(i):FlowDirection

Type the coded flow direction for the nozzle. Specifying the correct flow direction code for each part port is very important, because the software automatically orients the part to the flow direction of the pipe or port to which the part is connected.

Appendix: Electrical

This appendix contains information about everything you see under the main Conduits and Cableway nodes in the tree view. You may have to bulkload some optional workbooks to see all the information described in this appendix.

The information is organized in the same order as it appears in the tree view.

In This Appendix

Cable Tray Parts

The **Cable Tray Parts** node defines all of the cable tray parts that are available in the catalog.

Almost all cable tray parts are represented by symbols. You can find which symbol is used for a particular delivered part by looking in the **Symbol Definition** column.   Symbols are named after the text that precedes the period. In this example, the part uses symbol SP3D90HCableTray. For more information about symbols, see the *Symbols Reference Data Guide* available from the **Help > Printable Guides** command in the software.

Cable tray symbols can be defined in terms of different dimensions. In some cases, a manufacturer specifies the geometry based on face-to-face dimensions, while in other cases, a manufacturer specifies the geometry based on face-to-center dimensions.

When defining cable tray parts, remember that there are three sets of dimensions: nominal, actual, and load.

- Cable tray parts are commonly called, or referred to, by their nominal width and nominal depth dimensions.

- The actual width and actual depth dimensions are the real world dimensions of the cable tray part—if you used a measuring tape to measure the part.

- The load width and load depth dimensions are the "inside" dimensions available in the cable tray part for the placement of cables. The software uses the load width and load depth dimensions when calculating allowable fill area. In the delivered parts, the load width and

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load depth are set equal to the nominal width and nominal depth. However, you can edit the load width and load depth dimensions if needed.
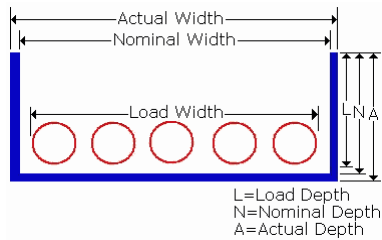
Below is a complete listing of all the properties, both common and unique, that you will see on a part sheet.

Common Properties

These properties appear for all part classes. The properties are listed here in the order that they appear, from left to right, on the part sheet.

Part Number

Type the unique identification for the part as found in the catalog data.

Part Description

Type a description for the part.

Manufacturer

Enter the code that represents the manufacturer of the part. This property is used to track the manufacturer for reporting.

Material

Specify the material of the part.

Tray Type

Specify the type of cable tray, such as ladder.

Component Type

Specify the type of component.

Unique Properties

Unique properties appear only for certain classes. The properties are listed here in alphabetical order.

Actual Depth[port number]

Enter the actual depth of the cable tray at the port. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter an actual depth for each port.

Actual Width[port number]

Enter the actual width of the cable tray at the port. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter an actual width for each port.

Bend Angle

Enter the bend angle for the part. Include the units, such as **Deg** for degrees.

Bend Radius

Enter the bend radius for the part. Include the units, such as **in** for inches or **mm** for millimeters.

Dry CogX

Type the center-of-gravity location for the part along the x-axis when the part is empty.

Dry CogY

Type the center-of-gravity location for the part along the y-axis when the part is empty.

Dry CogZ

Type the center-of-gravity location for the part along the z-axis when the part is empty.

Dry Weight

Type the total dry weight for the part.

Face to Tangent

Enter the face to tangent dimension of the part. Include the units, such as **in** for inches or **mm** for millimeters.

Insertion Depth

Enter the insertion depth. This value is the distance between the end of the cable tray part and the location of the cable port. Only positive values are allowed. Include the units, such as **in** for inches or **mm** for millimeters.

Length

Specify the length of the part. Include the units, such as **in** for inches or **mm** for millimeters.

Load Depth[port number]

Specifies the load depth of the cable tray part at the port. This is the depth available for cables in the tray. Usually, this is the same as the **Nominal Depth** value, but can be smaller if required. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter a nominal depth for each port.

Load Width[port number]

Specifies the load width of the cable tray part at the port. This is the width available for cables in the tray. Usually this is the same as the **Nominal Width** value, but can be smaller if required. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter a nominal width for each port.
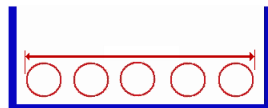
Load Span Classification

Enter the code that represents the classification of load span based on National Electrical Manufacturers Association (NEMA) standards.

Mirror Behavior Option

Specify the mirror behavior for the part.

Nominal Depth

Enter the nominal depth of the part. Include the units, such as **in** for inches or **mm** for millimeters.

Nominal Depth[port number]

Enter the nominal depth of the cable tray part at the port. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter a nominal depth for each port.

Nominal Width

Enter the nominal width of the part. Include the units, such as **in** for inches or **mm** for millimeters.

Nominal Width[port number]

Enter the nominal width of the cable tray part at the port. Include the units, such as **in** for inches or **mm** for millimeters. A part can have multiple ports, and you can enter a nominal width for each port.

Reducing Size

Enter the reducing size dimension of the part. Include the units, such as **in** for inches or **mm** for millimeters.

Replacement Part Number

Type the part number for replacements of the part.

Rung Spacing

Specify the rung spacing for the part. Include the units, such as **in** for inches or **mm** for millimeters.

Symbol Definition

Type the symbol definition for the part. For more information about symbols, see the *Symbols Reference Data Guide*.

Tangent Length

Enter the tangent length for the part. Include the units, such as **in** for inches or **mm** for millimeters.

Cable Tray Specifications

The **Cable Tray Specification** node determines the specification that you access when you route a new run of cable tray, select an existing run of cable tray, or create cable tray features and parts. The five cable tray specifications which determine the specification that you access include **Manufacturer**, **Material**, **TrayType, RungSpacing**, and **LoadSpanClassification.**

Default Bend Radius

Type the default throat radius width. Example values for bend radii are **12in**, **24in**, and **36in**.

Description

Type a phrase that describes the cable tray specification. For example, you can explain the purpose of this particular specification.

Fitting to Fitting Connection Part #X Component Class

Select the component class for the fitting to fitting connection part.

Fitting to Fitting Connection Part #X Component Type

Select the component type for the fitting to fitting connection part.

Fitting to Fitting Connection Part #X Quantity

Enter the number of parts required.

Load Span Classification

Specify the load span classification. This load span is based on requirements in Section 3.2 of the NEMA Standard VE 1-1991.

Load Span Classification Practice

Specify the load span classification.

Manufacturer

Specify the manufacturer of the cable tray component. This property is used to track the manufacturer for reporting.

Material

Specify the material of the cable tray component.

Rung Spacing

Type the measurement for the distance of spacing between rungs. For example, **6in**, **9in**, **12in**, and **18in**.

Spec Name

Type the name to assign to the cable tray specification.

Tray to Fitting Connection Part #X Component Class

Select the component class for the tray to fitting connection part.

Tray Specification Type

Indicates if the specification applies to cable trays, cableways, or duct banks. "1" represents Cableway, "2" represents Cable Tray, and "3" represents Duct Bank. Valid codes are listed in the **AllCodeLists.xls** workbook on the **Tray Specification Type** sheet in the **Codelist Number** column.

Tray to Fitting Connection Part #X Component Type

Select the component type for the tray to fitting connection part.

Tray to Fitting Connection Part #X Quantity - Enter the number of parts required.

Tray to Tray Connection Part #X Component Class

Select the component class for the tray to tray connection part.

Tray to Tray Connection Part #X Component Type

Select the component type for the tray to tray connection part.

Tray to Tray Connection Part #X Quantity

Enter the number of parts required.

Tray Length

Enter the tray length. This tray length is used when splitting cable trays.

Tray Type

Specify the type of cable tray, such as ladder.

NOTE Use the following attributes as inputs when querying the electrical parts catalog: component type, nominal sizes, manufacturer, material, tray type, load span classification and optionally default bend radius.

Cableway Specifications

The **Cable Way Specifications** node determines the specification that you access when you route a new run of cableway or create cableway features such as transitions and turns.

Default Bend Radius

Type the default for the throat radius width. Example values for bend radii are **12in**, **24in**, and **36in**.

Description

Type a phrase that describes the cableway specification. For example, you can explain the purpose of this particular specification.

Fitting to Fitting Connection Part #X Component Class

Leave undefined.

Fitting to Fitting Connection Part #X Component Type

Leave undefined.

Fitting to Fitting Connection Part #X Quantity

Leave set to 0.

Tray Specification Type

Indicates if the specification applies to cable trays, cableways, or duct banks.

Load Span Classification

Leave undefined.

Load Span Classification Practice

Leave undefined.

Manufacturer

Specify the manufacturer of the material in the reserved cableway space. This property is used to track the manufacturer for reporting.

Material

Specifies the material that will reside in the reserved cableway space.

Preferred Connection Gap

Leave set to 0.

Rung Spacing

eave set to 0.

Spec Name

Type the name to assign to the cableway specification.

Tray to Fitting Connection Part #X Component Class

Leave undefined.

Tray to Fitting Connection Part #X Component Type

Leave undefined.

Tray to Fitting Connection Part #X Quantity

Leave set to 0.

Tray to Tray Connection Part #X Component Class

Leave undefined.

Tray to Tray Connection Part #X Component Type

Leave undefined.

Tray to Tray Connection Part #X Quantity

Leave set to 0.

Tray Length

Leave set to 0.

Tray Type

Leave **Undefined**

Duct Bank Specifications

The **Duct Bank Specifications** node determines the specification that you access when you route a new run of duct bank or create cableway features such as transitions and turns.

Default Bend Radius

Type the default for the throat radius width. Example values for bend radii are **12in**, **24in**, and **36in**.

Description

Type a phrase that describes the data bank specification. For example, you can explain the purpose of this particular specification.

Fitting to Fitting Connection Part #X Component Class

Leave undefined.

Fitting to Fitting Connection Part #X Component Type

Leave undefined.

Fitting to Fitting Connection Part #X Quantity

Leave set to 0.

Tray Specification Type

Indicates if the specification applies to cable trays, cableways, or duct banks.

Load Span Classification

Leave undefined.

Load Span Classification Practice

Leave undefined.

Manufacturer

Specify the manufacturer of the material in the reserved cableway space. This property is used to track the manufacturer for reporting.

Material

Specifies the material that will reside in the data bank space.

Preferred Connection Gap

Leave set to 0.

Rung Spacing

Leave set to 0.

Spec Name

Type the name to assign to the duct bank specification.

Tray to Fitting Connection Part #X Component Class

Leave undefined.

Tray to Fitting Connection Part #X Component Type

Leave undefined.

Tray to Fitting Connection Part #X Quantity

Leave set to 0.

Tray to Tray Connection Part #X Component Class

Leave undefined.

Tray to Tray Connection Part #X Component Type

Leave undefined.

Tray to Tray Connection Part #X Quantity

Leave set to 0.

Tray Length

Leave set to 0.

Cableway Bend Radius

The **Bend Radius** node determines the cableway bend radii that are available for each specification.

Bend Radius

Assign the measurement that corresponds to the cableway that you are routing. Examples are **100mm**, **200mm**, and **300mm**.

Cableway Shapes

The **Flat Oval**, **Rectangular**, and **Round** nodes under **Cableways > Specifications > Cable Way Specifications >** [spec name] **> Shapes** node control which cross sections are available in the cableway specification. The sizes relate to the various types of cableway cross sections, including rectangular, round, and flat oval that you can place in the **Electrical** task.

Area

Enter the area of the shape. Include the units of measure when defining this value.

Corner Radius

Enter the corner radius of the shape. Include the units of measure when defining this value.

Cross Section

Select the cross section shape (round, flat oval, or rectangular).

Dimension Base

Select **No**.

Perimeter

Enter the distance around the shape. Include the units of measure when defining this value.

Section Name

Identifies the outfitting cross section (OCS). Examples are **OCS-4X4**, **OCS-6X4**, and **OCS-8X4**.

Shape Depth

Enter the depth of the shape.

Shape Width

Enter the width of the shape.

Type

This field is read-only.

See Also

Conduit Commodity Material Control Data

The **Conduit > Commodity Material Control Data** node defines the material control data for the conduit specification. This information does not vary per conduit specification.

Alternate Orientation Commodity Code (Optional)

Enter the contractor commodity code for the alternate orientation conduit commodity. The software uses this alternate conduit commodity when the original asymmetrical conduit commodity is mirrored or mirror copied and the new orientation is not representative of the component. In this case the original conduit commodity is replaced by the alternate orientation conduit commodity specified here.

Alternate Reportable Commodity Code (Optional)

Specify the contractor commodity code for an alternate reportable conduit commodity that is to be created with the primary conduit commodity on the basis of the conduit materials class. The materials list includes the short description of both the primary conduit commodity and the reportable conduit commodity. The data for the reportable conduit commodity includes a commodity code and the corresponding short and long material descriptions, plus the typical data that is reported for any other conduit commodity.

Bolting Requirements

Select the bolting requirements for the conduit commodity.

Cap Screw Engagement Gap (Conditionally Required)

Specify the total gap between the cap screw ends inserted into each threaded hole end. The engagement gap is used in the bolt length calculations for cap screws in threaded holes. Use this field when an engagement gap that is unique to a component is needed.

This engagement gap value is used for all cap screw diameters regardless of the cap screw diameter or the nominal diameter for the fitting requiring the cap screws. If you do not specify a value here, then the default value for the conduit specification is used.

Clamp Requirement (Conditionally Required)

Select whether or not the commodity requires a clamp if one or more mechanical ends apply. This option overrides the clamp query in the clamp selection filter when the value of the Termination Subclass is set to "Mechanical joint with clamp" or "Mechanical joint with clamp and hub or ferrule".

Client Commodity Code

Enter the client commodity code, which is the commodity code that is used during the

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operations and maintenance phase.

NOTE The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size-independent or size-dependent. One cannot be size-dependent and the other one be size- independent. In addition, both must include a schedule or neither must include a schedule.

Contractor Commodity Code

Enter the contractor commodity code, which is the commodity code that is used during the design phase.

NOTE The **Contractor Commodity Code** and the **Client Commodity Code** properties both must be size-independent or size-dependent. One cannot be size-dependent and the other one be size- independent. In addition, both must include a schedule or neither must include a schedule.

Fabrication Requirement

Select the fabrication requirement.

Fabrication Type

Select the fabrication type.

First Size From

Defines the lower bound of the largest nominal diameter for which this conduit commodity applies within the conduit materials class.

First Size To

Defines the upper bound of the largest nominal diameters for which this conduit commodity applies within the conduit materials class.

First Size Units

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Gasket Requirements

Specify the commodity gasket requirements.

Geometric Industry Standard

Specify the source used in the preparation of the catalog data applicable to the conduit commodity.

Hyperlink To Electronic Vendor

Type the URL address to the electronic vendor catalog.

Industry Commodity Code

Enter the industry commodity code, which is the commodity code that is used to access the catalog.

Legacy Commodity Code (Optional)

Type the commodity code required by a legacy material control system, if different from the contractor commodity code. For some legacy material control systems, the commodity codes are inadequate for Smart 3D. For example, the material control system uses the same commodity code for a globe valve from Manufacturer A and Manufacturer B, even

when the face-to- face dimension of the two valves are different. You are required to use different commodity codes for these parts in Smart 3D. However, you may also have a requirement to track the globe valve based on its legacy commodity code. Use this column to solve the problem.

The legacy commodity code can be size-independent or size-dependent. However, the contractor commodity code and the legacy commodity code both must be size- independent, or both must be size-dependent commodity codes. Likewise, both the contractor commodity code and the legacy commodity code must include schedule, or neither must include schedule.

Localized Short Material Description

Type a description for the material. The software uses this description in the bill- of-materials part of isometric drawings when construction personnel require a different language than what was used in the **Short Material Description** box.

Long Material Description

Type a description for the material to use when requisitioning.

Loose Material Requirements

Specify the loose material requirements for the conduit commodity.

Manufacturer

Select the manufacturer of the conduit commodity. This property is used to track the manufacturer for reporting.

Manufacturer Industry Practice

Select the manufacturer industry practice.

Manufacturer Part Number (Optional)

Enter the manufacturer's part number for the object.

Multiport Valve Operator Requirement

Select whether or not operators are required for multiport valves.

MultiSize Option

Type a string to represent an optional conduit commodity selection for multi-sized fittings when the first size and second size are inadequate.

For example, if two additional sizes (2" and 1") are required in addition to a first size of 6" and a second size of 4", the string that would represent the sizes would be 6x4x2x1. The software interprets the string to determine the second size and the number of sizes in addition to the first size and second size. Do not include a unit of measure in the string. The unit of measure for the first size, defined in the **First Size Units** column is used.

Part Data Source (Required)

Enter the source of the bolt, gasket, nut, or washer that you want to specifically have reported. If you do not enter a value, the source of the data is assumed to be the conduit commodity class data.

Quantity of Alt Reportable Parts (Optional)

Enter the number of alternate reportable conduit commodities to be reported per instance of the piping commodity. If you have defined a commodity code in the **Alt Reportable**

Commodity Code column but do not define a value in this column, the software uses a default value of one.

Quantity of Reportable Parts

Type the number of items to be reported per instance of the conduit commodity. This value must be an integer.

Reportable Commodity Code

Type the commodity code of the commodity that you want created with the primary commodity code object. For example, you may want safety covers or housings reported for material control but not represented graphically in the model. You would enter the commodity code of the safety cover here.

Reporting Requirement

Select the reporting requirement.

Reporting Type

Select the reporting requirements for the conduit commodity. You can specify that the commodity is reported or not reported.

Second Size From

Defines the lower bound of the next largest nominal diameter for which this conduit commodity applies within the conduit materials class.

Second Size To

Defines the upper bound of the next largest nominal diameters for which this conduit commodity applies within the conduit materials class.

Second Size Units

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Short Material Description

Type a description for the material. The software uses this description in the bill-of- materials part of isometric drawings, for reporting, and for visual feedback to the designer for design, construction, and fabrication.

Substitute Cap Screws Quantity

Type the number of machine bolts or studs that are being replaced by cap screws at each bolted end of the conduit commodity.

For non-through bolted fittings, the number of cap screws to substitute for machine bolts or studs required by the drilling template is the same as the number of machine bolts or studs being replaced.

For through bolted fittings with threaded holes, the number of cap screws required is twice the number of machine bolts or studs being replaced.

This value is not required when all bolts defined by the drilling template are replaced by cap screws.

Substitute Cap Screw Contractor Commodity Code

Type the contractor commodity code for the replacement cap screws.

Substitute Cap Screw Diameter

Type the diameter of the cap screw including the units. For example, type **0.5in** or **1in**.

Supply Responsibility

Specify the person responsible for supplying the commodity.

Tapped Hole Depth

Type the depth of the tapped hole in the valve or fitting that requires substitution cap screws, including the units. This value is not required for substitution cap screws at threaded holes.

Tapped Hole Depth 2 (Conditionally Required)

Type the depth of the tapped hole at port two of an asymmetrical fitting that requires substitution cap screws (or substitution tap end stud bolts), if applicable.

Valve Operator Type

Specify the specific type of valve operator, actuator, or appurtenance.

Valve Operator Geometric Industry Standard

Specify the source used in the preparation of the catalog data applicable to the valve operator.

Valve Operator Catalog Part Number

Type the commodity code for the valve operator as found in the catalog data and the material control data.

Vendor

Specify the vendor that is supplying the conduit commodity. This property is optional, but can be used to track the vendor for reporting.

Vendor Part Number (Optional)

Enter the vendor's part number for the object.

Welding Requirement

Select the conduit welding requirement.

Conduit Stock

The **Conduit Stock** node defines the conduit parts that you want in your catalog.

Commodity Type

Type the conduit commodity type short description or the corresponding codelist value.

Density

Specify the material density including the units, for example: 490lbm/ft^3 or 7856kg/m^3.

End Preparation[port number]

Enter the end preparation code for the part port.

End Standard[port number]

Enter the end standard code for the part port.

First Size Schedule

Specify the schedule (or thickness) for the first size end of this conduit commodity. This data is only required when the commodity code does not include schedule.

▼ NOTE If the code for the schedule represents a thickness value, the units of measure for the wall thickness may differ from the units of measure for the nominal diameter.

Graphical Representation Or Not

Specify whether or not the part should appear in the model.

Industry Commodity Code

Type a commodity code for the conduit part. The software uses this commodity code to find the conduit in the parts catalog. This code must be unique across the catalog.

Lining Material

Specify the lining material, if any, for the part. Examples of lining material include epoxy, rubber, and plastic.

Material Grade

Specify the material grade for the part.

NPD[port number]

Type the nominal diameter for the end. If both ends have the same NPD, you still must enter the same NPD value in both the **NPD[1]** and **NPD[2]** columns.

NPD Unit Type[port number]

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Purchase Length

Specify the length in which the conduit can be purchased including the units, for example 6m or 20ft. If you do not specify a purchase length, the software uses the **Maximum Pipe Length** value for the purchase length.

Schedule Thickness[port number]

Type the schedule thickness short description or code for the part port.

Conduit Parts

The **Conduit > Parts** node defines all of the conduit parts that are available in the catalog.

Almost all conduit parts are represented by symbols. You can find which symbol is used for a particular delivered part by looking in the **Symbol Definition** column. For example, if you look at the **ConduitCPL** sheet, you will see that SP3DConduitCoupling.CCoupling is the symbol definition. Symbols are named after the text that comes before the period. In this example, the part uses symbol SP3DConduitCoupling.

Below is a complete listing of all the properties, both common and unique, that you will see on a part sheet.

Common Properties

These properties appear for all part classes.

Bend Angle

Specify the bend angle, if any, for the part.

Bend Radius

Type the allowable bend radius as an absolute value. If you define a value in this column, do not define a value in the **Bend Radius Multiplier** column.

Bend Radius Multiplier

Type the NCD multiplier that you want to use to define the bend radius. This value is required only for bends. If you define a value in this column, do not define a value in the **Bend Radius** column.

Commodity Type

Type the conduit commodity type short description or the corresponding codelist value.

Dry COG X

Type the center-of-gravity location for the part along the x-axis when the part is empty.

Dry COG Y

Type the center-of-gravity location for the part along the y-axis when the part is empty.

Dry COG Z

Type the center-of-gravity location for the part along the z-axis when the part is empty.

Dry Weight

Enter the empty weight of the part. Be sure to specify the units when entering this value.

End Preparation[port number]

Specify the end preparation for the part port.

End Standard[port number]

Specify the end standard for the part port.

First Size Schedule

Specify the schedule (or thickness) for the first size end of this conduit commodity. This data is only required when the commodity code does not include schedule.

NOTE If the code for the schedule represents a thickness value, the units of measure for the wall thickness may differ from the units of measure for the nominal diameter.

Graphical Representation Or Not

Specify whether or not the part should appear in the model.

ID[port number]

Type a unique identifying name for the port.

Industry Commodity Code

Specify the industry commodity code for the part. All industry commodity codes must be unique across the entire catalog.

Lining Material

Specify the lining material, if any, for the part. Examples of lining material include epoxy, rubber, and plastic.

Material Grade

Specify the material grade for the part.

NPD[port number]

Type the nominal diameter for the part port. Unless you specify otherwise, the software defines port 1 as the primary port.

NPD Unit Type[port number]

Specify the units for the **NPD** column. For example, type **mm** or **in**.

Piping Point Basis[port number]

Specify the piping point basis that identifies the function of the port.

Schedule Thickness[port number]

Specify the schedule thickness short description or code for the part port.

Second Size Schedule

Specify the schedule (or thickness) for the second size end of this conduit commodity. This data is only required when the commodity code does not include schedule.

Symbol Definition

Type the symbol definition for the part.

Surface Area

Enter the surface area of the part. This value is required for determining the quantity of paint and insulation and the weight of the insulation. Be sure to specify the units when entering this value.

Volumetric Capacity

Specify the amount of fluid that the part can hold. This value is required for the analysis of heat tracing requirements. Be sure to specify the units when entering this value.

Water Weight

Enter the water weight of the part. Be sure to specify the units when entering this value.

Water COG X

Type the center-of-gravity location for the part along the x-axis when the part is filled with water.

Water COG Y

Type the center-of-gravity location for the part along the y-axis when the part is filled with water.

Water COG Z

Type the center-of-gravity location for the part along the z-axis when the part is filled with water.

Unique Properties

Unique properties appear only for certain classes. The properties are listed here in alphabetical order.

Face 1 to Center

Type the length from the port 1 face to center.

Face 2 to Center

Type the length from the port 2 face to center.

Face to Center

Type the distance from the face of the port to the center of the part.

Face to End

Type the distance from the face of the port to the end of the cap.

Face to Face

Type the distance from the port 1 face to the port 2 face.

📄 **NOTE** The following three properties are custom attributes and are used in the Pull box part class.

IJUAElectricalEquipment::ElecEquipmentLength

Type the length of the electrical equipment.

IJUAElectricalEquipment::ElecEquipmentHeight

Type the height of the electrical equipment.

IJUAElectricalEquipment::ElecEquipmentWidth

Type the width of the electrical equipment.

Union Diameter

Specify the diameter of the union.

Default Conduit Commodity Selection Rule

The **Default Conduit Commodity Selection Rule** node defines which short code should be used during the automatic placement of fittings.

Feature Type

Enter the feature type.

Functional Short Code

Enter the short code to use for the defined feature type.

Conduit Specifications

The **Conduit** > **Specifications** node determines the specification that you access when you route a new run of conduit or select an existing run of conduit.

Material

Specifies the material that composes the conduit. For example, you can type **Steel**.

Service

Specifies the service type of the conduit. For example, you can type **Conduit Spec CS0 Service**.

Spec Name

Type the name to assign to the conduit specification.

Conduit Filter

The **Conduit Filter** node defines the data required to select the conduit commodity when routing.

Bend Radius

Allows you to assign the turn radius to use while routing. The throat radius can determine the proper cables to use within the conduit. The software considers rules for the default throat radius for routing.

Bend Radius Multiplier

Specifies a factor used in determining the absolute bend radius value, which is the product of the nominal diameter times the bend radius multiplier.

Comments

Type an optional brief description of the conduit commodity.

Commodity Option

Type an option code. The option code gives the software a way of recognizing the default component when more than one component will work.

Contractor Commodity Code

Enter the contractor commodity code, which is the commodity code that is used during the

design phase.

First Size From

Defines the lower bound of the largest nominal diameter for which this conduit commodity applies within the conduit materials class.

First Size To

Defines the upper bound of the largest nominal diameters for which this conduit commodity applies within the conduit materials class.

First Size Units

Specifies the units for the **First Size From** and **First Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Short Code

Type a short code for this row. A short code is used as a grouping or designation for each component so you can select the component. The software uses the short code to automatically insert components. An example for conduit is **Conduit Bend**. If you need to create new short codes, go to the **Tools > Options** dialog box, and then select the **Short Codes** tab. Scroll to the bottom of the list and type a new short code in the blank line. Click **Apply**.

Second Size From

Defines the lower bound of the next largest nominal diameter for which this conduit commodity applies within the conduit materials class.

Second Size To

Defines the upper bound of the next largest nominal diameters for which this conduit commodity applies within the conduit materials class.

Second Size Units

Specifies the units for the **Second Size From** and **Second Size To** columns. For example, you could enter **in** for inches or **mm** for millimeters.

Selection Basis

Defines values that indicate if the conduit is available for the designer to select manually or only for selection as a result of a rule.

Spec Name

Specify the conduit specification (materials class) for which the conduit commodity is intended. You must define the conduit specification in the **Conduit** > **Specifications** node before you can use it. For more information, see *Conduit Specifications* (on page 526).

Permissible Nominal Conduit Diameters Rule

The **Conduit Nominal Diameters** node defines what nominal conduit diameters (NCD) are valid for the different conduit materials classes. These NCDs appear on the **New Conduit** dialog box in the **Nominal Conduit Diameter** box.

NPD

Type the nominal conduit diameter that you want available for the conduit materials class.

NPD Unit Type

Specify the units for the nominal conduit diameter value that you entered in the **NPD** column. For example, type **mm** or **in**.

Spec Name

Type the name of the conduit specification (materials class) for which you are defining valid nominal diameters. The specification that you enter must be defined on the *Conduit Specifications* (on page 526).

A P P E N D I X E

Appendix: Structure

This appendix contains information about everything you see under the main Structure node in the tree view. You may have to bulkload some optional workbooks to see all the information described in this appendix.

The information in this appendix is organized in the same order as it appears in the Catalog tree view.

In This Appendix

Assembly Connections
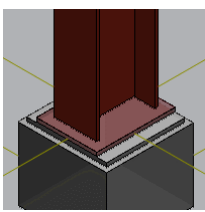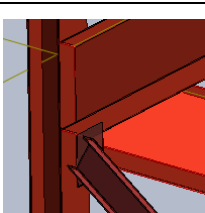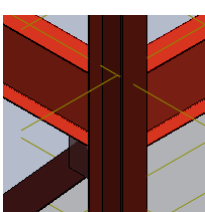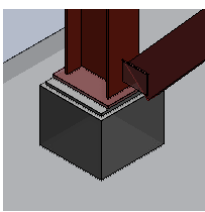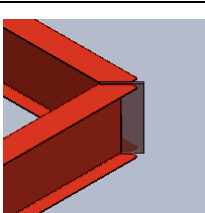
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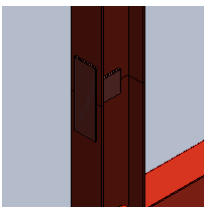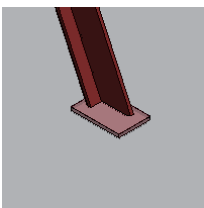
Frame Assembly Connections

Frame assembly connections are similar to frame connections, but define the necessary trimming between member parts and the generation of parts such as base plates, gusset plates, and clip angles. Assembly connections control member features including cutbacks, copes, notches, bolt holes, and slots. Whether or not features are placed depends on the member assembly connection type and the geometry of the connection between the members.
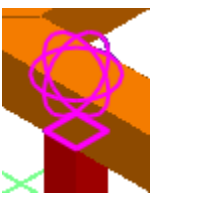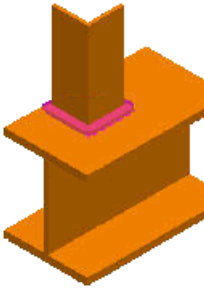
The following general assembly connections are delivered with the software:

	The base plate assembly connection places a plate at the end of an unsupported member. This assembly connection requires an unsupported frame connection on one member. For example, use this assembly connection to place a base plate at the bottom of a column.
	The corner gusset plate assembly connection connects a vertical brace to a beam and column intersection using a gusset plate. This assembly connection requires a frame connection with three members, such as vertical corner brace.
	The fitted assembly connection connects two members. This assembly connection requires a frame connection with two members, such as axis, seated, or flush. Examples of this connection include a beam framing into a column or a beam framing into another beam.
	The gusset plate assembly connection connects a vertical or horizontal brace to a beam or a vertical brace to a column using a gusset plate. This assembly connection requires a frame connection with two members, such as axis.
	The miter assembly connection connects two members that meet at an angle but are co-planar. This assembly connection requires a frame connection with two members, such as axis. In addition, the members must be end connected.

	The splice assembly connection connects two members that are collinear and end connected. This assembly connection requires a frame connection with two members, such as axis.
	The general surface assembly connection connects a member end with a nonmember surface such as a slab, a deck, or a hull plate. The member is cut to surface and a base plate is placed on the member end.

End Cut Assembly Connections

The following end cut assembly connections are delivered with the software:

	The end cut along assembly connection cuts the end of one member to the sides or bottom of another member along the second member's length.
	The end cut bearing plate assembly connection connects the end of a member along the axis of another member. This is typically used to attach the end of a member to the flange of the supporting member. The bearing plate connection works at any angle and provides circular, rectangular, and triangular bearing plates depending on the supported member's shape.
	The end cut miter assembly connection connects two members that meet at an angle but are co-planar. This assembly connection required a frame connection with two members, such as axis. In addition, the members must be end connected.
	The end cut split assembly connection connects two members that are collinear and end connected. This assembly connection requires a frame connection with two members, such as axis.
	The end cut split long box assembly connection is used when the supported and supporting members are perpendicular to each other. The supporting member is cut square to the supported member while an item from the Axis category is placed on the supported member.

	The end cut split seam angle assembly connection is used when the supported and supporting members are: ▪ member axes are collinear to each other ▪ have identical cross-section type and size ▪ have identical cardinal point and rotation values
	The end cut split short box assembly connection is used when the supported and supporting members are perpendicular to each other. The supported member is cut square to the supporting member while an item from the Axis category is placed on the supporting member.

End Cut Assembly Naming Conventions

Each end cut assembly connection name consists of three parts:
[EndCutCase]_[WebCutType]_[FlangeCutType]

where:

- [EndCutCase]

    - **Axis** - Supported member is bounded by the axis curve of the supporting member

    - **LongBox** - End-to-end perpendicular supported member is extended, and an axis end cut is applied to the supporting member

    - **ShortBox** - End-to-end perpendicular supporting member is extended, and an axis end cut is applied to the supported member

    - **Miter** - End-to-end non-collinear

    - **Split** - End-to-end collinear

    - **SeamAngle** - End-to-end collinear where one end is extended

- [WebCutType]

    The WebCutType is used to type of web cut that is to be applied at the top of the web and at the bottom of the web. The following combinations are available (W indicates a straight cut, C indicates a Cope cut, and S indicates a Snipe cut):

    - W#W#

    - W#C#

    - W#S#

    - C#C#

    - C#S#

    - C#W#

    - S#S#

    - S#C#

    - S#W#

- [FlangeCutType]

The FlangeCutType is used to type of flange cut that is to be applied at the left flange section and at the right flange section. The following combinations are available (W indicates a straight cut, C indicates a cope cut, and S indicates a snipe cut):

- W#W#
- W#S#
- S#S#
- S#W#

You cannot apply different flange cuts when the supported member has both a top flange and a bottom flange. In these cases, the same flange cut type is applied to both the top and bottom flange.

You cannot apply different web cuts or flange cuts in the end-to-end cases. The end-to-end cases place a web cut and flange cut on both the supported member and the supporting member. For these cases, the same web cut and flange cut are applied to both the supported member and the supporting member.

1 - Top left flange
2 - Top right flange
3 - Web top
4 - Web bottom
5 - Bottom right flange
6 - Bottom left flange
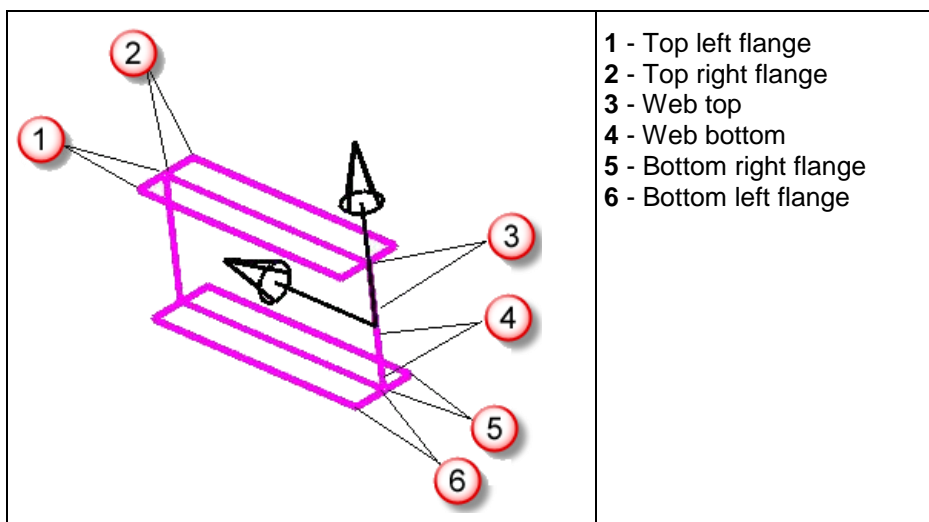
Corner Gusset Assembly Connections

The **Corner Gusset Assembly Connection** node defines the corner gusset assembly connections that you can place using the **Place Assembly Connection** 🔧 command in the **Structure**.

These assembly connections connect a vertical brace to a column and a beam using a gusset plate. The vertical brace must be in the same plane as the column and beam, and the angle between the column and the beam must be greater than the angle between the vertical brace and the column.

Name

Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Thickness

Specifies the thickness of the gusset plate.

Length

Specifies the length of the gusset plate. This is dimension B in the figure.

Width

Specifies the width of the gusset plate. This is dimension A in the figure.

Overlap Length

Specifies the distance the vertical brace overlaps the gusset plate. This is dimension C in the figure.

Clearance Primary

Specifies the clearance distance between the gusset plate and the column. This is dimension E in the figure.

Cut Length

Specifies the length of the chamfer cut.

Cut Width

Specifies the width of the chamfer cut.

Squared End

Specifies whether or not the end of the vertical brace is squared off.

Clearance

Specifies the minimum distance between the vertical brace and the beam or the column, whichever one is closer. This is dimension D in the figure.

Category

Enter the plate category code for the base plate.

Type

Enter the plate type code for the base plate.

Material

Defines the gusset plate material type.

Grade

Defines the gusset plate grade.

Definition

Specifies the corner gusset assembly connection definition macro.
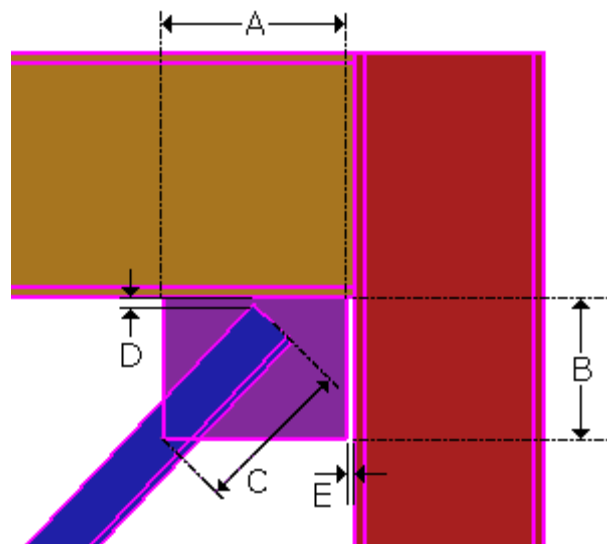
Fitted Assembly Connections

The **Fitted Assembly Connection** node defines the fitted assembly connections that you can place using the **Place Assembly Connection** ⬚ command in the **Structure**.

Fitted assembly connections are used to connect one beam to another beam or to connect a beam to a column.

Name

Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Web Clearance

Specifies the distance between the webs of the two members. Dimension A in the figure.

Flange Clearance 1

Specifies the flange side clearance. This is dimension B in the figure.

Flange Clearance 2

Specifies the flange inside clearance. This is dimension C in the figure.

Length

Specifies the length of the cope. This is dimension D in the figure.

Depth

Specifies the depth of the cope. This is dimension E in the figure.

Radius

Specifies the radius of the cope at the intersection of the flange clearance 1 and flange clearance 2.

Increment

Specifies the value by which to increment the cope dimension. For example, if you set the Increment to 2" (inches), the cope dimension is always divisible by 2 (2", 4", 6", 8", ... 22", 24", 26", and so forth). Similarly, if you set the Increment to 3", the cope dimension is always divisible by 3 (3", 6", 9", 12", and so forth). Setting the Increment value to 0 causes the cope to be the exact length needed to clear.

Sizing Rule

Enter the sizing rule code for the cope dimensions.

Squared End

Specifies whether the end of the member is squared or skewed when the two members are not perpendicular. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Always Planar

Specifies whether the end of the member has copes or not. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Definition

Specifies the fitted assembly connection definition macro.

Gusset Plate Assembly Connections

The **Gusset Plate Assembly Connection** node   defines the gusset plate assembly connections that you can place using the **Place Assembly Connection** ![icon] command in the **Structure** task.

These assembly connections connect a vertical or horizontal brace to a beam or a vertical brace to a column using a gusset plate.

Name

Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Thickness

Specifies the thickness of the gusset plate.

Length

Specifies the length of the gusset plate. This is dimension A in the figure.

Width

Specifies the width of the gusset plate. This is dimension B in the figure.

Overlap Length

Specifies the distance the vertical or horizontal brace overlaps the gusset plate. This is
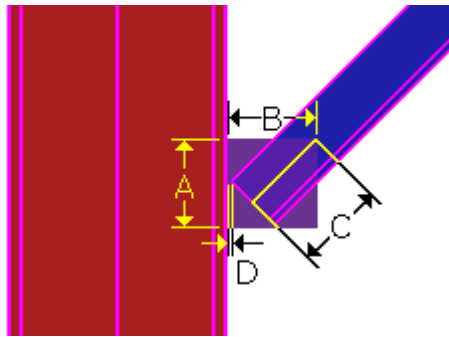
dimension C in the figure.

Cut Length

Specifies the length of the chamfer cut.

Cut Width

Specifies the width of the chamfer cut.

Squared End

Specifies whether or not the end of the vertical or horizontal brace is squared off.

Clearance

Specifies the minimum clearance distance between the end of the vertical or horizontal brace and the supporting beam or column. Dimension D in the figure.

Category

Enter the plate category code for the plate.

Type

Enter the plate type code for the plate.

Material

Defines the gusset plate material type.

Grade

Defines the gusset plate grade.

Definition

Specifies the gusset plate assembly connection definition macro.

Mitre Assembly Connections

The **Mitre Assembly Connection** node   defines the mitered assembly connections that you can place using the **Place Assembly Connection** 🖾 command.

These assembly connections connect two members that meet at an angle. A plate can optionally be placed between the members.

Name

> Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Thickness

> Specifies the plate thickness.

Length

> Specifies the length of the plate (side parallel to the strong axis of the members).

Width

> Specifies the width of the plate (side parallel to the weak axis of the members).

Clearance

> Specifies the distance between the member ends.

With End Plates

> Specifies whether or not a plate should be inserted between the member ends. Enter 0 to not place the plate. Enter 1 to place the plate.

Top Distance

> Specifies the distance between the top of the section range box of the first member and the top of the plate.

Bottom Distance

> Specifies the distance between the bottom of the section range box of the first member and the bottom of the plate.

Left Distance

> Specifies the distance between the left of the section range box of the first member and the left edge of the plate.

Right Distance

> Specifies the distance between the right of the section range box of the first member and the right edge of the plate.

Sizing Rule

Enter the sizing rule code for the assembly connection.

Symmetry

Enter the symmetry code for the mitre assembly connection. This controls how to cut back the member ends when the clearance value is not zero. Select the **Center** code to specify that both members should be cut back equally. Select the **Right** code to specify that the first member that you selected be cut back. Select the **Left** code to specify that the second member that you selected be cut back.

Category

Enter the plate category code for the plate.

Type

Enter the plate type code for the plate.

Material

Defines the plate material type.

Grade

Defines the plate grade.

Definition

Specifies the mitre assembly connection definition macro.

Splice Assembly Connections

The **Splice Assembly Connection** node   defines the splice assembly connections that you can place using the **Place Assembly Connection** command in the **Structure** task.

These assembly connections connect two collinear members using web and flange plates. The members must also have the same section and be oriented in the same direction.
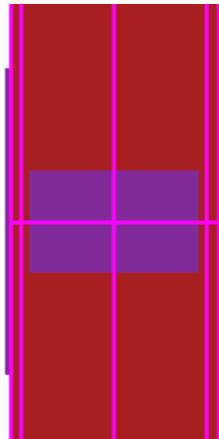
Name

Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Clearance

Specifies the distance between the ends of the members.

Symmetry

Enter the symmetry code for the splice assembly connection. This controls how to cut back the member ends when the clearance value is not zero. Select the **Center** code to specify that both members should be cut back equally. Select the **Right** code to specify that the first member that you selected be cut back. Select the **Left** code to specify that the second member that you selected be cut back.

Splice With

Enter the splice type code for the splice assembly connection.

Web Plates

Enter the web plate position code for the splice assembly connection.

Gage Distance 1

Specifies the distance from the flange gage line.

Gage Distance 2

Specifies the distance from the web gage line.

Sizing Rule

Enter the sizing rule code for the splice assembly connection. If you select **By Rule**, then the software sizes the plate based on the gage distances.

Thickness 1

Specifies the thickness of the flange plates.

Length 1

Specifies the length of the flange plates.

Width 1

Specifies the width of the flange plates.

Category 1

Enter the plate category code for the flange plates.

Type 1

Enter the plate type code for the flange plates.

Thickness 2

Specifies the thickness of the web plates

Length 2

Specifies the length of the flange plates.

Width 2

Specifies the width of the flange plates.

Category 2

Enter the plate category code for the web plates.

Type 2

Enter the plate type code for the web plates.

Material

Defines the plate material type.

Grade

Defines the plate material grade.

Definition

Specifies the splice assembly connection definition macro.

Base Plate Assembly Connections

The **Base Plate Assembly Connection** node   defines the base plate assembly connections that you can place using the **Place Assembly Connection** 🔩 command in the **Structure**.

Name

Specifies the name of the base plate assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Thickness

Specify the thickness of the base plate.

Length

Specify the length of the base plate. This is dimension A in the figure.

Width

Specify the width of the base plate. This is dimension B in the figure.

Depth Clearance

Specify the clearance between the flange of the member and the edge of the base plate. This is dimension C in the figure.

Width Clearance

Specify the clearance between the flange of the member and the edge of the base plate. This is dimension D in the figure.
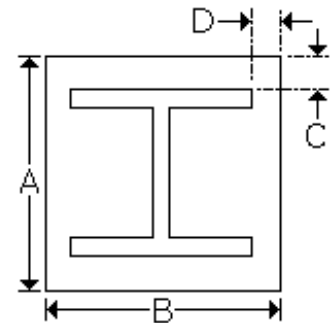
Sizing Rule

Enter the sizing rule code for the base plate assembly connection.

Category

Enter the plate category code for the base plate.

Type

Enter the plate type code for the base plate.

Material

Defines the base plate material type.

Grade

> Defines the base plate grade.

Definition

> Specifies the base plate assembly connection definition macro.

General Surface Assembly Connections

The **General Surface Assembly Connection** node   defines the general surface assembly connections that you can place using the **Place Assembly Connection** [icon] command in the **Structure**. These assembly connections connect a member end to a flat surface by trimming the member end to the surface.
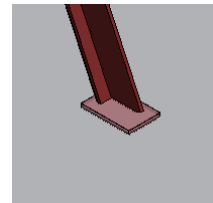
Name

> Specifies the name of the assembly connection. This is the name that appears in the interface when you are placing the assembly connection.

Clearance

> Specifies the distance between the end of the member and the surface.

Definition

> Specifies the surface assembly connection definition macro.

With Pad

> Type **1** to place a steel pad between the member end and the surface. Type **0** to have the member end connect directly to the surface.

Pad Type

> Defines the shape of the pad. Type **1** to have the software automatically select the pad type. Type **2** to place a rectangular pad. Type **3** to place a circular pad. Type **4** to place a triangular pad.

Sizing Rule

> Select whether you want to the software to automatically size the pad or if you want to size the pad. Type **1** to have the software size the pad. Type **2** to use a user defined size.

Offset

> Type the distance between the end of the member and the face of the surface.

Slab Assembly Connections

Slab assembly connections are similar to member assembly connections, but define the trimming and edges of slabs. Slab assembly connections are placed automatically when the slab is created.

The slab assembly connections are:

- The Slab by Member Boundary assembly connection is placed by the software when you select a member as a slab boundary.

- The Slab Free Edge Assembly connection is placed by the software when you select a grid line as a slab boundary.

Slab By Member Boundary Assembly Connection

The **Slab By Member Boundary Assembly Connection** node   defines the slab assembly connections available when the slab is bounded by structural members.

Name

Enter a part number for the assembly connection. This identification must be unique across the entire catalog.

Definition

Specifies the assembly connection definition macro.

Clearance

Enter a clearance distance between the edge of the slab and the member.

Port Face Position

Select the location on the member at which the slab is to stop. You can select the outmost plane, the centerline, or the in-most plane on the member.

Offset

Specify the distance between the selected **Port Face Position** and the edge of the slab. A negative value moves the edge into the body of the slab. A positive value moves the edge out from the body of the slab.

Detailed

Specifies if the assembly connection is a detailed connection.

See Also

Slab Free Edge Assembly Connection (on page 543)

Slab Free Edge Assembly Connection

The **Slab Free Edge Assembly Connection** node   defines the slab assembly connections available when the slab is bounded by a grid line.

Name

Enter a part number for the assembly connection. This identification must be unique across the entire catalog.

Definition

Specifies the assembly connection definition macro.

Reference Direction

Select the reference direction for the angle:

- **Normal** - The angle is measured from a vector perpendicular to the slab edge.
- **Horizontal** - The angle is measured from the global XY plane in the model.
- **Vertical** - The angle is measured from the Z-Axis in the model.

Angle

> Enter a slope for the slab edge represented by the assembly connection. If the slab was place using the **Face Position Top**, the side face rotates about the top slab edge. If the slab was placed using the **Face Position Bottom**, the side face rotates about the bottom slab edge.

Offset

> Specify the distance between the selected boundary object and the edge of the slab.

Wall Assembly Connections

The Wall Assembly Connections node defines the wall assembly connections that you can use. All wall assembly connections use a combination of these four properties.

Boundary Size

> Select whether the boundary is infinite or finite.

Boundary Type

> Select the boundary type: above, below, start, end, or contact.

Connection Type

> Select the connection type: aligned, along, or corner.

Offset

> Enter the offset distance between the wall and the boundary.

Reference

> When a member is used as a boundary for the wall, you can use this option to specify which part of the member the wall should use as the boundary: near, far, or center.
>
> - Select near when you want the wall to stop at the inner most plane of the bounding member.
>
> - Select center when you want the wall to stop at the member-line axis of the bounding member.

Select far when you want the slab to stop at the out-most plane of the bounding member.

Construction Details

Topics

Cope Feature

The **Cope Feature** node   defines the copes that you can place using **Place Assembly Connection** .

Name

Specifies the name of the cope. This is the name that appears in the interface when you are placing the cope.

Web Clearance

Specifies the distance between the webs of the two members. Dimension A in the figure.

Flange Clearance 1

Specifies the flange side clearance. This is dimension B in the figure.

Flange Clearance 2

Specifies the flange inside clearance. This is dimension C in the figure.

Length

Specifies the length of the cope. This is dimension D in the figure.

Depth

Specifies the depth of the cope. This is dimension E in the figure.

Radius

Specifies the radius of the cope at the intersection of the flange clearance 1 and flange clearance 2.

Increment

Specifies the value by which to increment the cope dimension. For example, if you set the Increment to 2" (inches), the cope dimension is always divisible by 2 (2", 4", 6", 8", ... 22", 24", 26", and so forth). Similarly, if you set the Increment to 3", the cope dimension is always divisible by 3 (3", 6", 9", 12", and so forth). Setting the Increment value to 0 causes the cope to be the exact length needed to clear.

Sizing Rule

Enter the sizing rule code for the cope dimensions.

Squared End

Specifies whether the end of the member is squared or skewed when the two members are not perpendicular. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Always Planar

Specifies whether the end of the member has copes or not. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Definition

Specifies the base plate assembly connection definition macro.

Generic Rect Plate Part

The **Generic Rectangular Plate Part** node   defines rectangular plate parts for use in the assembly connections that you can place using the **Place Assembly Connection** command.

Name

Specifies the name of the plate part.

Thickness

Specify the thickness of the plate.

Length

Specify the length of the plate.

Width

Specify the width of the plate.

Definition

Specifies the base plate assembly connection definition macro.

Gusset Plate Part Type 1

The **Gusset Plate Part Type1** node   defines gusset plate parts for use in the assembly connections that you can place using the **Place Assembly Connection** 🔳 command.

Name

Specifies the name of the gusset plate part.

Thickness

Specify the thickness of the plate.

Length

Specify the length of the plate.

Width

Specify the width of the plate.

Overlap Length

Specify the distance that the vertical or horizontal brace will overlap the gusset plate.

Clearance Primary

Specifies the minimum clearance distance between the end of the vertical or horizontal brace and the supporting beam or column.

Cut Length

Specify the length of the chamfer cut.

Cut Width

Specify the width of the chamfer cut.

Definition

Specifies the base plate assembly connection definition macro.

Gusset Plate Part Type 2

The **Gusset Plate Part Type2** node   defines gusset plate parts for use in the assembly connections that you can place using the **Place Assembly Connection** 🔳 command.

Name

Specifies the name of the gusset plate part.

Thickness

Specify the thickness of the plate.

Length

Specify the length of the plate.

Width

Specify the width of the plate.

Overlap Length

Specify the distance that the vertical or horizontal brace will overlap the gusset plate.

Cut Length

Specify the length of the chamfer cut.

Cut Width

Specify the width of the chamfer cut.

Definition

Specifies the base plate assembly connection definition macro.

Pad Plate Rectangular

The **Rectangular Pad Plate Part** node defines rectangular pad plate parts for use in the assembly connections that you can place using **Place Assembly Connection** .

Name

Specifies the name of the pad plate part.

Definition

Specifies the pad plate definition macro.

Sizing Rule

Enter the sizing rule ID.

Length

Specify the length of the pad.

Width

Specify the width of the pad.

Thickness

Specify the thickness of the pad.

Corner Radius

Specify the fillet radius for the pad corners.

Planar Cutback Feature

The **Planar Cutback Feature** node defines the copes that you can place using the **Trim Member** command.

Name

Specifies the name of the cope. This is the name that appears in the interface when you are placing the cope.

Clearance

Specifies the distance between the flanges of the two members.

Squared End

Specifies whether the end of the member is squared or skewed when the two members are not perpendicular. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Definition

Specifies the base plate assembly connection definition macro.

Surface Trim

The **Surface Trim** node   defines the surface trims that you can place using the **Trim Member** command.

Fitted assembly connections are used to connect one beam to another beam or to connect a beam to a column.

Name

Specifies the name of the surface trim. This is the name that appears in the interface when you are defining trims.

Definition

Specifies the surface trim definition macro.

Offset

Specifies the offset between the member end and the surface being trimmed to. This value is only used when the surface being trimmer to is planar.

Squared End

Specifies whether the end of the member is squared or skewed when the two members are not perpendicular. Set this option to 0 if you want the member end to look like end A in the figure. Set this option to 1 if you want the member end to look like end B in the figure.

Flange Angle

Specifies the angle between the normal to the cutting surface and the member axis in the

horizontal plane with respect to the member (the flange plane).
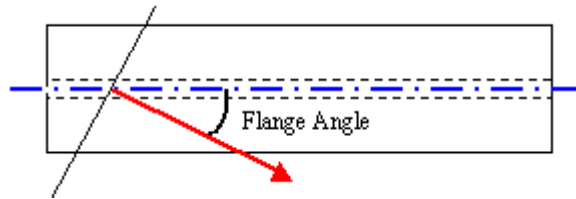
Web Angle

Specifies the angle between the normal to the cutting surface and the member axis in the vertical plane with respect to the member (the web plane).
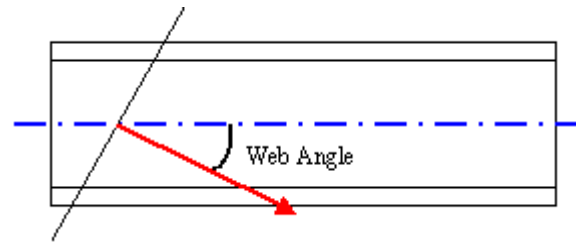
Trim End

Specifies which member end is being trimmed. Enter **1** for the start. Enter **2** for the end.

Web Corner Cope

The **Web Corner Cope Feature** node   defines the web copes that you can place using the **Trim Member** ▤ command in the **Structure** task.

Fitted assembly connections are used to connect one beam to another beam or to connect a beam to a column.

Name

Specifies the name of the feature. This is the name that appears in the interface when you are defining trims.

Min Cope Length Clearance

Specifies the distance between the flanges. This is dimension B in the figure.

Min Cope Depth Clearance

Specifies the distance between the web and the flange. This is dimension C in the figure.

Rounding Increment

Specifies the value by which to increment the cope dimension. For example, if you set the Increment to 2" (inches), the cope dimension is always divisible by 2 (2", 4", 6", 8", 10", and so on). Similarly, if you set the Increment to 3", the cope dimension is always divisible by 3 (3", 6", 9", 12", and so on). Setting the Increment value to 0 causes the cope to be the exact length needed to clear.

Cope Radius

Specifies the radius of the cope at the intersection of the cope length clearance and cope

depth clearance. These are corners A in the figure.
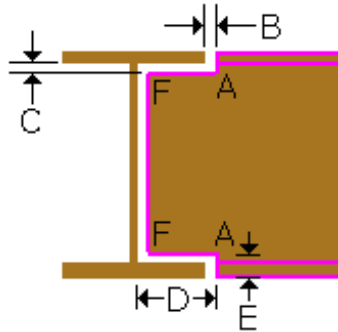
Cope Radius Type

Specifies the type (**Radius** (1), **Chamfer** (2), or **None** (0)) for the cope radius.

Web Radius

Specifies the web radius of the member being coped. These are corners F in the figure.

Web Radius Type

Specifies the type (**Radius** (1), **Chamfer** (2), or **None**) (0) for the web radius.

Cope End

Used for reporting. Leave blank.

Cope Length

Specifies the cope length. This is dimension D in the figure.

Cope Depth

Specifies the cope depth. This is dimension E in the figure.

Cope Edge

Used for reporting. Leave blank.

Definition

Specifies the web cope definition macro.

Logical Connections

Topics

Frame Connections

The **Structure > Connections > Logical Connections > Frame Connections** node defines frame connections, which describe the positioning relationship between member systems.

Axis

Defines axis frame connections. For more information, see *Axis Frame Connections* (on page 554).

Axis Colinear

Defines axis colinear frame connections. For more information, see *Axis Colinear Frame Connections* (on page 555).

Centerline

Defines centerline frame connections. For more information, see *Centerline Frame Connections* (on page 555).

Flush

Defines flush frame connections. For more information, see *Flush Frame Connections* (on page 556).

Gap

Defines gap frame connections. For more information, see *Gap Frame Connections* (on page 557).

Seated

Defines seated frame connections. For more information, see *Seated Frame Connections* (on page 559).

Surface

Defines surface frame connections. For more information, see *Surface Frame Connections* (on page 560).

Vertical Corner Brace

Defines vertical corner brace frame connections. For more information, see *Vertical Corner Brace Frame Connections* (on page 562).

Align Frame Connections

The **Align** node   defines the align frame connections that are available. The align frame connection places the member end at the intersection of three surfaces that you define.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the align frame connection definition macro SPSFrameConnMacros.Align.

Side Justification

Select the side of the plane on which to place the member.

- **None** - Aligns the member axis so that it is placed on the surface.

- **Seated** - Sets the member on top of the surface. The selected **Orientation Side** is nearest the surface.

- **Center** - The center of the cross-section is placed on the surface. The center is calculated by the top-bottom, left-right bounds of the cross-section shape.

- **Flush** - Uses the alignment surface's top and bottom extent to position the supported member. The supported member typically lies within the body of the alignment plane with one edge of the member flush with the alignment surface but can be offset.
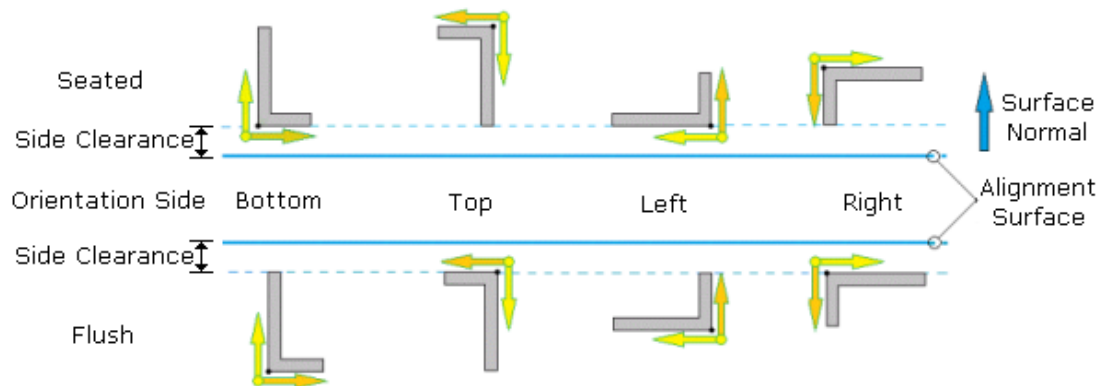
Orientation Control

If **On**, the member angle is controlled by the **Orientation Angle** value defined for the Align frame connection. If **Off**, you can set the angle of the member independently of the align surface by using the **Rotation** property for the member part.

Orientation Side
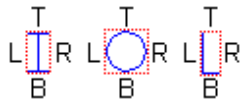
Specifies the side of the supported member's cross-section that is mated to the alignment surface. You can specify **Top**, **Right**, **Bottom**, or **Left**. Edges of typical section shapes are shown in the figure.

Orientation Angle

When **Orientation Control** is **On**, this angle is added to the selected **Orientation Side** to rotate the member. If the Align frame connection is used on both ends of the member and you define a different angle value for each end, the angle defined at the start end of the member is used.

Reflect
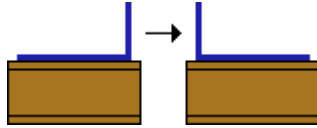
Reflects or mirrors the cross-section of the supported member about a plane perpendicular to the supporting member side. An example of when to use this option is when you place a supported member with an angle cross-section using the left edge option and you want the angle facing the other direction.

Extend Distance

Specifies the offset distance from the bounding surface along the member's axis.

Side Clearance

Specify the offset distance perpendicular to the align surface to place the member axis.

Lateral Distance

Specifies the offset distance in the plane of the align surface to place the member axis.

Axis Frame Connections

The **Axis** node   defines the axis frame connections that are available. An axis frame connection aligns the cardinal points of the supporting and the supported member systems.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the axis frame connection definition macro to use.

X Offset

Specifies an offset to apply in the x-direction after the two cardinal points are aligned.

Y Offset

Specifies an offset to apply in the y-direction after the two cardinal points are aligned.

Z Offset

Specifies an offset to apply in the z-direction after the two cardinal points are aligned.

Coordinate System

Specifies the coordinate system to use for the offset values. Local is the local coordinate system of the supporting member.

Supporting CP

Specifies to which cardinal point on the supporting member system to align the supported

member system's cardinal point. You can specify any cardinal point number, or select 0 to use the cardinal point with which the supporting member was placed.

Axis Colinear Frame Connections

The **Axis Colinear** node   defines the end colinear frame connections that are available.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the frame connection definition macro to use.

X Offset

Specifies an offset to apply in the x-direction after the two cardinal points are aligned.

Y Offset

Specifies an offset to apply in the y-direction after the two cardinal points are aligned.

Z Offset

Specifies an offset to apply in the z-direction after the two cardinal points are aligned.

Coordinate System

Specifies the coordinate system to use for the offset values. Local is the local coordinate system of the supporting member.

Supporting CP

Specifies to which cardinal point on the supporting member system to align the supported member system's cardinal point. You can specify any cardinal point number, or select 0 to use the cardinal point with which the supporting member was placed.

Centerline Frame Connections

The **Centerline** node   defines the centerline frame connections that are available. A centerline frame connection uses the supporting member's centerline to position the supported member.
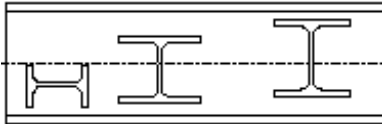
Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the centerline frame connection definition macro.

Side

Select the side of the supporting member on which you want to place the supported member.

Offset

Specify the distance to place the supported member from the supporting member. For seated and flush frame connections, the offset is between the side of the supporting member that you specified with the **Side** option and the supported member's side that you specify with the **Edge** option. For centerline frame connections, the offset is between centerline of the supporting member and the supported member's side that you specify with the **Edge** option.

Edge

Specifies the side of the supported member's cross-section that is mated to the supporting member. You can specify **Top**, **Right**, **Bottom**, or **Left**. Edges of typical section shapes are shown in the figure.

Reflect

Reflects or mirrors the cross-section of the supported member about a plane perpendicular to the supporting member side. For example, when you place a supported member with an angle cross-section using the left edge option and you want the angle facing the other direction.

Flush Frame Connections

The **Flush** node defines the flush frame connections that are available. A flush frame connection uses the supporting member system's top and bottom extent to position the supported member. The supported member system typically lies within the body of the supporting member.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the flush frame connection definition macro.

Side

Select the side of the supporting member on which you want to place the supported member.

Offset

Specify the distance to place the supported member from the supporting member. For seated and flush frame connections, the offset is between the side of the supporting member that you specified with the **Side** option and the supported member's side that you specify with the **Edge** option. For centerline frame connections, the offset is between centerline of the supporting member and the supported member's side that you specify with the **Edge** option.

Edge

Specifies the side of the supported member's cross-section that is mated to the supporting member. You can specify **Top**, **Right**, **Bottom**, or **Left**. Edges of typical section shapes are shown in the figure.

Reflect

Reflects or mirrors the cross-section of the supported member about a plane perpendicular to the supporting member side. For example, when you place a supported member with an angle cross-section using the left edge option and you want the angle facing the other direction.

Gap Frame Connections

The **Gap** node   defines the gap frame connections that are available. A gap frame connection defines offsets between members to provide clearance for welding or simply as a work point adjustment. Smart 3D can calculate the offset either axially along or radially around the primary member.

There are three members in a gap frame connection:

- The *target* member is the member always to move and is the owner of the frame connection. The target member is shown as blue in the following figures.

- The *primary* member is the member that the target member moves along (axially) or around (radially). The primary member is shown as red in the following figures.

- The *secondary* member is the third member in the joint, and the offset is measured relative to this member. The software does not require the secondary member to be in the same plane as the target member. The secondary member is shown as orange in the following figures.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the gap frame connection definition macro to use.

Offset Required

Enter the gap distance that you want between the target and secondary member.

Centerline Distance Roundoff

Enter the distance to which the centerline gap should be rounded off.

Direction

Select the direction to calculate the gap.

- **Surface Axial** - Select this mode when you want to define the offset as the distance between the center lines of the target and secondary members. This distance is measured parallel to the primary member centerline.

- **Surface Radial** - Select this mode when you want to define the offset as the distance between the closest points on the hull of the target and secondary members. This distance is measured around the hull of the primary member.

Centerline Design Factor

Enter the ratio of the member section size to use in calculating whether the centerline design passed or failed. The default value is 0.25. The centerline design pass/fail is calculated by taking the primary member's section size, multiplying it by **Centerline Design Factor** and then comparing that value to the **Actual Centerline Distance** value.

Offset Along

Defines if the target member moves along the Primary member or along the Secondary member to create the gap.

Offset Type

Select how you want to specify the **Offset Required** value.

- **Gap** - The **Offset Required** distance is between the two closest points of the target member hull and the secondary member hull. This is shown as G in the figures below.

- **Centerline** - The **Offset Required** distance is between the center line of the target member and the center line of the secondary member. This is shown as X in the figures below.

- **Overlap** - The **Offset Required** distance is between the lowest point of the target and secondary member saddle on the support member to the point where the target and secondary member intersect. This is shown as L in the figures below.

Overlap Design Factor (Fmin)

Defines the minimum design factor for the calculation: Min × B < A < Max × B. The default value is 0.3. This calculation is used to determine if **Design Passed (Overlap)** passes or fails. The A and B distances are shown in the figures below.

Overlap Design Factor (FMax)

Defines the maximum design factor for the calculation: Min × B < A < Max × B. The default value is 0.5. This calculation is used to determine if **Design Passed (Overlap)** passes or fails. The A and B distances are shown in the figures below.

Flush Direction

Specify which direction you want the target member to move to become flush with the primary member.

Flush Offset

Specify the distance from the primary member hull edge to the target hull edge. An offset of zero indicates that the two member edges are perfectly flush.
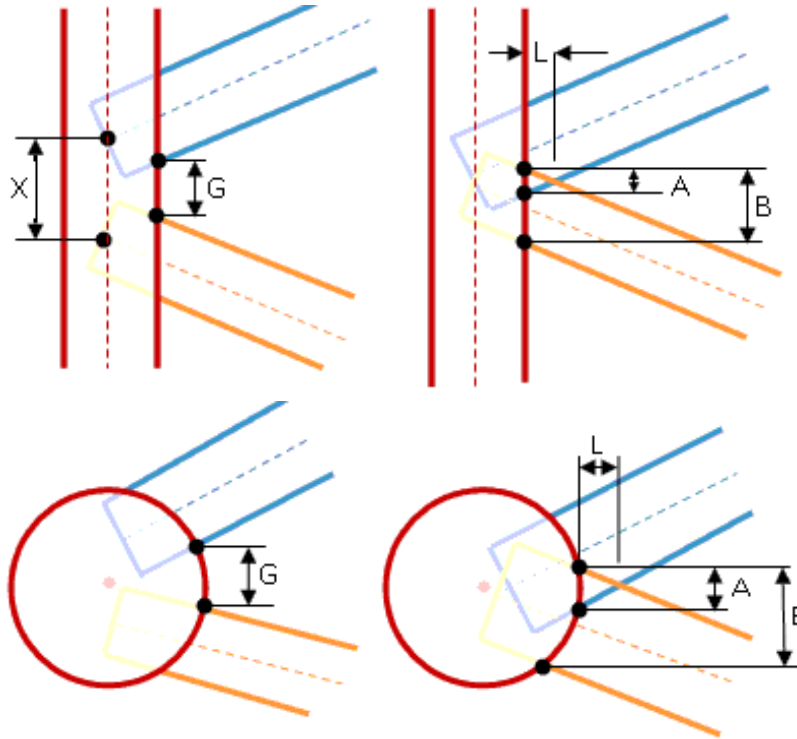
Seated Frame Connections

The **Seated** defines the seated frame connections that are available. A seated frame connection uses the supporting member system's top or bottom extent to position the supported member system. The supported member typically rests against the supporting member, but can be offset.
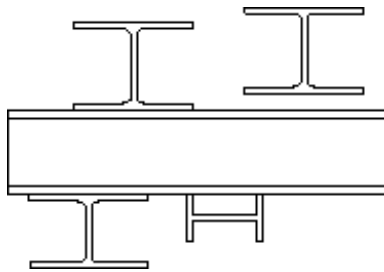
Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

Specifies the seated frame connection definition macro.

Side

Select the side of the supporting member on which you want to place the supported

member.

Offset

Specify the distance to place the supported member from the supporting member. For seated and flush frame connections, the offset is between the side of the supporting member that you specified with the **Side** option and the supported member's side that you specify with the **Edge** option. For centerline frame connections, the offset is between centerline of the supporting member and the supported member's side that you specify with the **Edge** option.

Edge

Specifies the side of the supported member's cross-section that is mated to the supporting member. You can specify **Top**, **Right**, **Bottom**, or **Left**. Edges of typical section shapes are shown in the figure.

Reflect

Reflects or mirrors the cross-section of the supported member about a plane perpendicular to the supporting member side. For example, when you place a supported member with an angle cross-section using the left edge option and you want the angle facing the other direction.

Surface Frame Connections

The **Surface** node   defines the surface frame connections that are available.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.
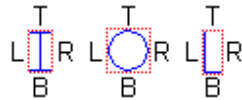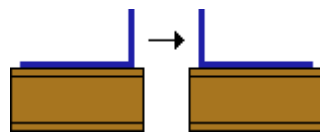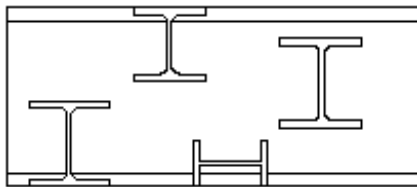
Definition

Specifies the surface frame connection definition macro to use.

X Offset

Specifies an offset to apply in the x-direction.

Y Offset

Specifies an offset to apply in the y-direction.

Z Offset

Specifies an offset to apply in the z-direction.

Coordinate System

Specifies the coordinate system to use for the offset values.

Tangent Frame Connections

The **Tangent** node   defines the tangent frame connections that are available. The tangent frame connection places the member end tangent to another member.

Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

Definition

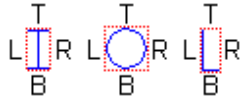Specifies the align frame connection definition macro SPSFrameConnMacros.Tangent.

Offset Distance

Type the distance (**3**) from the centerline of the supporting member (**2**) to the tangent connection point. This distance is the radius of the circle to which the supported member (**1**) is made tangent.
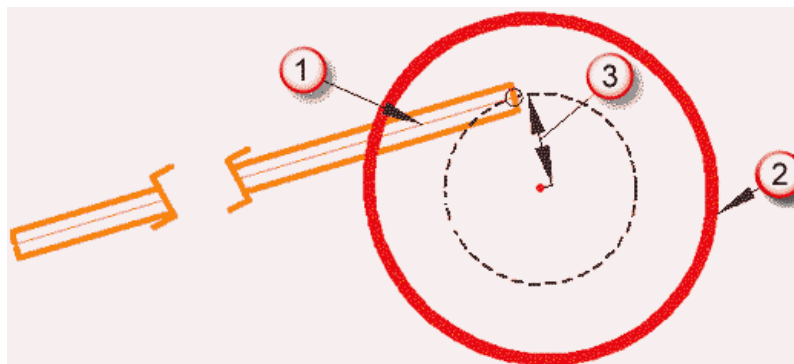
Side

Select **Left** or **Right** to define on which side of the supporting member the supported member is placed. To determine left and right, image you are standing on the start end of the member with your head towards positive global Z looking down the length of the member. Your left and right determine the direction of **Left** and **Right**.

Tangent Plane

Controls the plane on which the tangent circle is drawn. You can select:

- **Horizontal** - The tangent circle is parallel to the X-Y plane (normal to global Z) regardless of the slope of any of the members. For example, you are creating a tangent connection between the sloping green beam and the sloping red column, or between the sloping blue beam and the sloping red column.
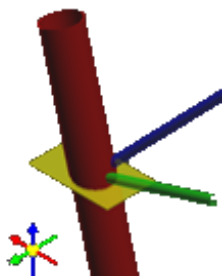
- **Vertical** - The tangent circle is parallel to global Z and is aligned with the centerline of the supported member (green member in the left figure, blue member in the right figure).
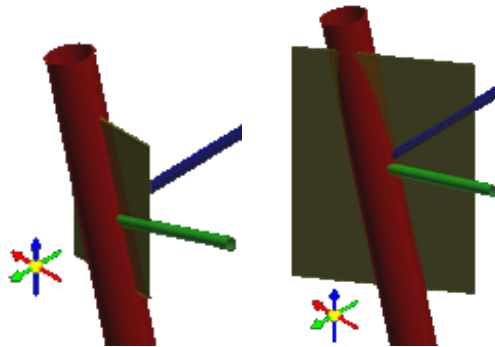
- **Normal to Supporting** - The tangent circle is normal to the supporting member (the sloping red column).
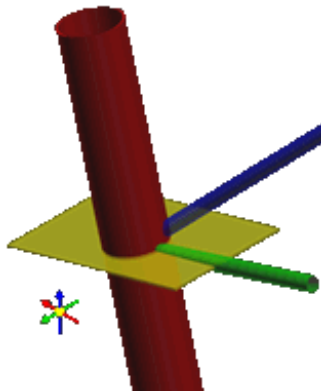
- **In Plane of Supported** - The tangent circle is parallel to the centerline of the supported member and normal to the supporting member centerline (green member in the left figure, blue member in the right figure).
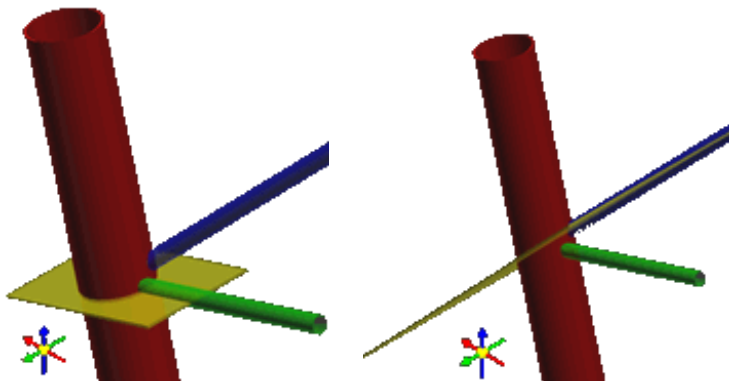
Vertical Corner Brace Frame Connections

The **Vertical Corner Brace** node   defines the vertical corner brace frame connections that are available. A vertical brace corner connection specifies the location of a vertical brace that frames

into a column-beam corner. There are six work points to select from when using one of these connections.
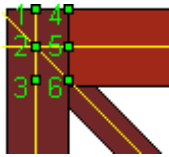
Name

Defines the name of the frame connection. This is the name that appears in the software when placing a member system in the model.

WorkPoint

Specify the work point location.

Definition

Specifies the axis frame connection definition macro to use.

Split Connections

The **Split Connections** node defines split connections, which describe how member systems are divided into member parts.

Split By Interference

Defines split by interference connections. For more information, see *Split By Interference* (on page 563).

Split By Surface

Defines split by surface connections. For more information, see *Split By Surface* (on page 563).

Split By Interference

The **Split By Interference** node   defines split by interference connections placed using the **Place Split** command.

Name

Specifies the name of the split connection. This is the name that appears in the interface when you are placing the split connections.

Definition

Specifies the split connection definition macro to use.

Split By Surface

The **Split By Surface** node   defines split by surface connections placed using the **Place Split** command.

Name

Specifies the name of the split connection. This is the name that appears in the interface

when you are placing the split connections.

Definition

Specifies the split connection definition macro to use.

Offset

Specifies the distance between the surface and the member ends at the split.

Equip Foundations

The **Equip Foundations** node defines the equipment foundations assemblies that you want to add to your catalog and hence to your model. Equipment foundations transfer loads from equipment to supports. To do this, the equipment foundation assembly reads the foundation port information defined on the equipment symbol to orient and size the foundation. The distance between the equipment foundation port and the supporting object defines the equipment foundation height.

When creating your equipment foundations, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

The required attributes used by ISPSEquipFndInputCriteria interface must be defined for each equipment foundation assembly that you define in the workbook. The required attributes are:

Name

Type a part name for the equipment foundation. The name must be unique across the entire catalog.

Symbol Definition

Type the name of the macro to use to construct the equipment foundation. If you do not enter a value here, the symbol definition defined at the top of the sheet under **Definition** is used.

Definition

Type the name of the macro that defines the equipment foundation.

Number Supported

Specifies the number of supported inputs. Enter 0..1 for none or one input, 1..n for at least one or more inputs, or specify the number of inputs explicitly by entering the number 1, 2, 3, and so forth.

Supported Filter Prog ID

Specifies a string for custom filtering supported objects.

Number Supporting

Specifies the number of supporting inputs. Enter 0..1 for none or one input, 1..n for at least one or more inputs, or specify the number of inputs explicitly by entering the number 1, 2, 3, and so forth.

Supporting Filter Prog ID

Specifies a string for custom filtering supporting objects.

See Also
Define New Equipment Foundation Part (on page 234)
Define New Equipment Foundation Part Class (on page 235)

Footings

The **Footings** node defines column footings part classes that you want to add to your catalog and hence to your model. When creating your footings, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

A footing is comprised of a slab, pier, and base plate. You can define footings uses two different methods:

- The assembly method uses unique component parts for the slab, pier, and base plate, and then groups the parts together by the assembly. Using this method, you can create a catalog of common footing parts, and then position the parts together in assemblies as needed. The positioning is possible because of information provided by the member system (A), the base plate (B), the coordinate system of the pier (C), and the coordinate system of the slab (D).
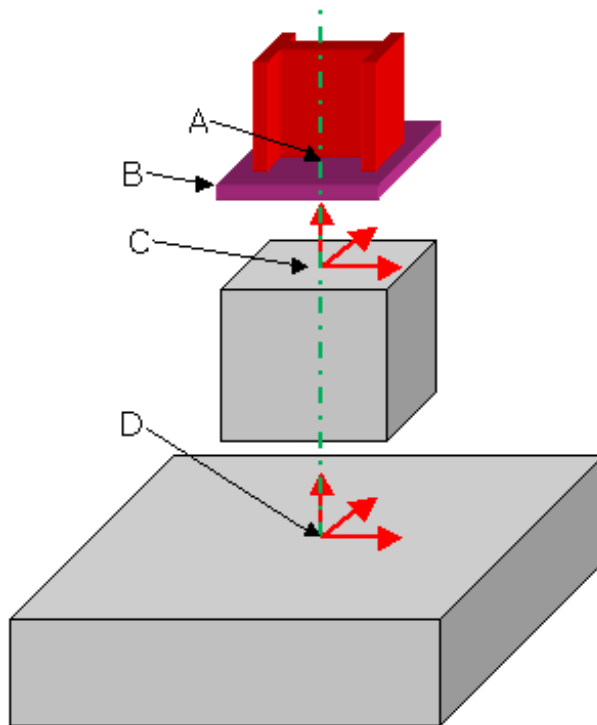
- The single component method uses a single part to define the slab, pier, and base plate dimensions.

The required attributes for footing assemblies are:

Number Supported

Specifies the number of supported inputs (number of columns) that the footing accommodates. You can enter a number of inputs (1, 2, 3, and so forth), enter 0 to indicate any number of inputs, or enter -1 to specify no inputs.

Supported Filter Prog ID

Enter a string that specifies a custom filter for selecting supported objects. This string can be an interface name or a custom filter program ID. Leave blank if you do not want to have a custom filter for selecting supported objects.

Number Supporting

Specifies the number of supporting inputs that the footing accommodates. You can enter a number of inputs (1, 2, 3, and so forth), enter 0 to indicate any number of inputs, or enter -1 to specify no inputs.

Supporting Filter Prog ID

Enter a string that specifies a custom filter for selecting supporting objects. This string can be an interface name or a custom filter program ID. Leave blank if you do not want to have a custom filter for selecting supporting objects.

See Also
Define New Footing Part (on page 233)
Define New Footing Part Class (on page 234)

Handrails

The **Handrails** node defines the handrail part classes that you want to add to your catalog and hence to your model. The handrails that are delivered are samples. Do not directly edit the sample handrails to create your custom handrails. We recommend that you copy the handrail, and then edit the copy.

When creating your handrails, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

Handrail part classes can optionally use a custom user interface with keywords in the name to display custom handrail properties on the ribbon bar during placement. Again, these custom attributes must be defined on the **Custom Interfaces** sheet. The IJUA_HRTypeX_ custom user interface provides:

- HRTypeX_SOSHRConnectionType - Displays a custom connection type codelist.

- HRTypeX_SPSHRBeginTreatment - Displays a custom end type codelist for the beginning of the handrail.

- HRTypeX_SPSHREndTreatment - Displays a custom end type codelist for the end of the handrail.

The required attributes used by IJHandrailProperties interface must be defined for each handrail part class that you define. The required attributes are:

Part Number

Type a part number for the handrail. The part number must be unique across the entire catalog.

Part Description

Type a description for the handrail.

Mirror Behavior Option

Specify the mirror behavior of the handrail part.

Horizontal Offset

Enter the horizontal offset from the defined handrail path to the handrail.

Begin Treatment

Enter the codelist value for the handrail end treatment for the beginning of the handrail.

End Treatment

Enter the codelist value for the handrail end treatment for the end of the handrail.

Post Connection Type

Enter the codelist value for the connection configuration.

See Also
Define New Handrail Part (on page 236)
Define New Handrail Part Class (on page 237)

Fireproofing Insulation Encasement Rules

The **Structure > Objects > Insulation > Fireproofing** node defines the encasement rules used in the **Structure** task's **Place Fireproofing** Command .

When processing the encasement rule, the software starts at the top and processes each row trying to find a matching Member Type Category and Cross Section Type to the member that you selected in the model. When it finds a match, the software uses the defined encasement type, fireproofing label, setback values, and insulation symbol defined for that row.

If the software cannot fine a matching Member Type Category and Cross Section Type row, then the first row that matches the Member Type Category and has an asterisk (*) for the Cross Section Type is used for the member.

For example, you select a bracing member in the model with a MC cross section. If you look at the snippet of an encasement rule for braces below, you will see that the software will look at the Pipe, WT, ST, L, and 2L rows trying to find the MC cross section. Since MC is not defined in the encasement rule, the software will use the first asterisk row, Brace_Block Encased_All_Conc. Multiple asterisk cross section rows can be defined to allow for manual selection during placement (the **By Rule** option on the ribbon is cleared).

Encasement Item	Member Type	Cross Section	Encasement Type
Brace_Round_ Pipe_Conc	3	Pipe	5
Brace_Custom_WT_Conc	3	WT	999
Brace_Custom_ST_Conc	3	ST	999
Brace_Custom_L_Conc	3	L	999
Brace_Custom_2L_Conc	3	2L	999
Brace_Block Encased_All_Conc	3	*	3
Brace_Contour Encased_All_Conc	3	*	1

Name

Defines the encasement item name. The delivered encasement items use the naming

---

convention of Member Type_Encasement Type_Cross Section_Material. We recommend that you use a similar naming convention or adopt the delivered naming convention.

Cross Section Type

Defines the cross section type to which the encasement option applies. The available cross section types depend on the section libraries that you have included in your Catalog. Examples of valid cross section types include: 2L, L, HSSC, W, and so forth. Use an asterisk (*) to indicate that the encasement item is applicable to all cross section types.

Definition

Defines the ProgID of the encasement rule. The delivered definition is `SPSMemberEncasements.MemberEncaseDef.`

Encasement Type

Specifies the encasement type. You can add encasement types by editing the **Member Fireproofing Application Type** select list in the Catalog task.

1 Contour Fully Encased

2 Contour Flange Exposed

3 Block Fully Encased

4 Block Flange Exposed

5 Block with Voids

6 Block with Voids Flange Exposed

7 through 988 are reserved by Intergraph for future use

999 is Custom

Fireproofing Label

Defines the fireproofing label to use on drawings.

Member Type Category

Defines the member type to which the encasement item applies. Member types are defined in the **Structural Member Type** select list in the Catalog task.

Setback Distance 1

Defines the distance between the **Setback Reference 1** location and the insulation/fireproofing.

Setback Distance 2

Defines the distance between the **Setback Reference 2** location and the insulation/fireproofing.

Setback Reference 1

Defines the location along the member from which to measure the insulation/fireproofing setback.

- **Part Start** - The start of the member part, which takes into account any assembly connection cutbacks or other features which may change member length.

- **Part End** - The end of the member part, which takes into account any assembly connection cutbacks or other features which may change member length.

- **Axis Start** - The start of the member part's axis, which will remain unaffected by member part features.
- **Axis End** - The end of the member part's axis, which will remain unaffected by member part features.

Setback Reference 2

Defines the location along the member from which to measure the insulation/fireproofing setback.

Symbol Definition

Defines the ProgID of the insulation symbol.

Ladders

The **Ladders** node defines the ladders that you want to add to your catalog and hence to your model. The ladders that are delivered are samples. Do not directly edit the sample ladders to create your custom ladders. We recommend that you copy the sample, and then edit the copy.

When creating your ladders, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

The required attributes used by IJSPSCommonStairLadderProperties interface must be defined for each ladder part class that you define. The required attributes are:

Part Number

Type a part number for the ladder. The part number must be unique across the entire catalog.

Part Description

Type a description for the ladder.

Mirror Behavior Option

Specify the mirror behavior of the ladder part.

Span

Enter the distance from the top support to the bottom support. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the ladder.

Height

Enter the overall projected vertical height, including custom extensions or gaps on the top or bottom. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the ladder.

Length

Enter the overall physical length for reporting purposes. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the ladder.

Width

Enter the horizontal width of the ladder. This is the default distance that is displayed on the

ribbon bar during placement.

Angle

Enter the angle of inclination from the bottom support. This is the default angle that is displayed on the ribbon bar during placement.

Step Pitch

Enter the maximum distance between the rungs of the ladder. This is the default distance that is displayed on the ribbon bar during placement.

Side

Enter 1 or 0. This attribute is a toggle for the placement side relative to the top support. The **Side** button on the ribbon bar toggles the value so the default setting is inconsequential.

See Also
Define New Ladder Part (on page 237)
Define New Ladder Part Class (on page 238)

Openings

The **Structure > Objects > Openings** node defines the standard openings that you want to add to your catalog and hence to your model.

See Also
Define New Opening Part (on page 242)
Define New Opening Part Class (on page 243)

Oval Opening

The **Oval Opening** node defines oval openings that you can place in the model.

Part Number

Enter a part number for the opening. This identification must be unique across the entire catalog.

Part Description

Enter a description for the opening.

Section Name

Specify a section name for the opening. This name must be unique within the section standard.

Area

Enter the opening area. Be sure to include the unit of measurement when defining this value.

Perimeter

Enter the total distance around the perimeter of the opening. Be sure to include the unit of measurement when defining this value.

Custom

Specifies if the opening can be changed. Enter **1** if the opening can be changed. Enter **0** if the opening cannot be changed.

Symbol Definition

Enter the symbol used to define the opening. For more information about creating 2D symbols, see the *2D Symbols User's Guide* available from the **Help > Printable Guides** page in the software.

Major Axis

Enter the major axis length of the opening.

Minor Axis

Enter the minor axis length of the opening.

See Also
Rectangle Opening (on page 572)
Square Opening (on page 573)
Triangle Opening (on page 574)

Rectangle Opening

The **Rectangle Opening** node   defines rectangular openings that you can place in the model.

Part Number

Enter a part number for the opening. This identification must be unique across the entire catalog.

Part Description

Enter a description for the opening.

Section Name

Specify a section name for the opening. This name must be unique within the section standard.

Area

Enter the opening area. Be sure to include the unit of measurement when defining this value.

Perimeter

Enter the total distance around the perimeter of the opening. Be sure to include the unit of measurement when defining this value.

Custom

Specifies if the opening can be changed. Enter **1** if the opening can be changed. Enter **0** if the opening cannot be changed.

Symbol Definition

Enter the symbol used to define the opening. For more information about creating 2D symbols, see the *2D Symbols User's Guide* available from the **Help > Printable Guides** page in the software.

Length

Enter the opening length. This is the shorter side.

Width

Enter the opening width. This is the longer side.

Fillet

Enter the fillet radius at the corners of the opening.

See Also

Square Opening

The **Square Opening** node   defines square openings that you can place in the model.

Part Number

Enter a part number for the opening. This identification must be unique across the entire catalog.

Part Description

Enter a description for the opening.

Section Name

Specify a section name for the opening. This name must be unique within the section standard.

Area

Enter the opening area. Be sure to include the unit of measurement when defining this value.

Perimeter

Enter the total distance around the perimeter of the opening. Be sure to include the unit of measurement when defining this value.

Custom

Specifies if the opening can be changed. Enter **1** if the opening can be changed. Enter **0** if the opening cannot be changed.

Symbol Definition

Enter the symbol used to define the opening. For more information about creating 2D symbols, see the *2D Symbols User's Guide* available from the **Help > Printable Guides** page in the software.

Length

Enter the length of the opening.

Fillet

Enter the fillet radius at the corners of the opening.

Triangle Opening

The **Triangle Opening** node   defines triangular openings that you can place in the model.

Part Number

Enter a part number for the opening. This identification must be unique across the entire catalog.

Part Description

Enter a description for the opening.

Section Name

Specify a section name for the opening. This name must be unique within the section standard.

Area

Enter the opening area. Be sure to include the unit of measurement when defining this value.

Perimeter

Enter the total distance around the perimeter of the opening. Be sure to include the unit of measurement when defining this value.

Custom

Specifies if the opening can be changed. Enter **1** if the opening can be changed. Enter **0** if the opening cannot be changed.

Symbol Definition

Enter the symbol used to define the opening. For more information about creating 2D symbols, see the *2D Symbols User's Guide* available from the **Help > Printable Guides** page in the software.

Length

Enter the opening length. This is the longest side of the triangle.

Width

Enter the opening width. This is the shorter two sides of the triangle.

Fillet

Enter the fillet radius at the corners of the opening.

Angle

Enter the non-90 degree corner angle.

See Also

Oval Opening (on page 571)
Rectangle Opening (on page 572)
Square Opening (on page 573)

Slabs

The **Structure > Objects > Slabs** node defines the slabs that you want to add to your catalog and hence to your model. When creating your slabs, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

Before defining slabs, you must define the layers that you plan to use to compose your slabs in the **Layers** node. For more information, see *Layers* (on page 578).

After defining your layers, you define the compositions of your slabs in the **Slab Composition** node, see *Define New Slab Composition Part* (on page 240). When the compositions are defined, you can then define your slabs in the **Slab General** node, see *Define New Slab General Part* (on page 241).

See Also
Define New Slab Composition Part (on page 240)
Define New Slab General Part (on page 241)
Define New Slab Layer Part (on page 241)
Define New Slab Layer Part Class (on page 242)

Slab Composition

The **Slab Composition** node   defines the combination of layers that you want to use in your slab. Before defining the combinations in this sheet, you must define the layers that you plan to use.

When creating your slabs, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*.)

Part Number

Enter a unique identification for the combination. This identification must be unique across the entire catalog.

Part Description

Enter a description for the combination.

Layer Number

Specify the number of layers that this combination will have.

Layer Type #

For each layer in the combination, enter the sheet name in the **StructSlabLayer.xls** workbook that contains the layer that you want to specify. For example, in the delivered **StructSlabLayer.xls** sample workbook, there are two sheets: SlabConcrete and SlabLayer. If you wanted to use a layer defined in the SlabConcrete sheet, you would enter that sheet name in this column.

Layer Part Number #

For each layer in the combination, enter the layer part number as specified on sheet you specified in **Layer Type #** column in the **StructSlabLayer.xls**.

StructSlabLayer Workbook

The **StructSlabLayer.xls** workbook defines the individual layers of slabs that you want to place. When creating your layers, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide.*)

For each layer part class type that you define, you must have the following required attributes defined.

Part Number

Type a part number for the layer. The part number must be unique across the entire catalog.

Part Description

Type a description for the layer.

Continuity

Enter the continuity codelist value for this layer. Valid codelist values are defined in the **AllCodeLists.xls** workbook on the **Slab Continuity** sheet in the **Codelist** column.

Material

Enter a description of the layer material.

Grade

Enter the material grade of the layer.

Thickness

Enter the thickness of the layer.

SubInterface Name

Enter the interface name.

Slab General Type

The **Slab General** node   defines the slabs that you want in your catalog. When creating your slabs, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide.*)

Before defining slabs in this sheet, you must define the layer combinations in the **Slab Composition Type** node .

Part Number

Enter a part number for the slab. This identification must be unique across the entire catalog.

Part Description

Enter a description for the slab.

Name Rule

Specify the name rule that you want to use to name this slab.

Priority

Specify the priority codelist value.

Continuity

Specify the continuity codelist value.

Composition

Enter the layer composition that you want to use. You must define these compositions in the **Slab Composition** node .

Fire Rating

Enter the fire rating for the slab.

Face Position

Specify face position codelist value.

Normal Offset

Specify the default offset from the reference plane for the slab. You can change the offset during placement if needed.

Boundary Offset Reference

Specifies the boundary offset reference codelist value.

Boundary Offset

Enter the default boundary offset distance. You can change the offset during placement if needed.

Main Direction Reference

Specify the slab direction codelist value.

Main Direction Angle

Specifies the angle for the slab.

Fastener Type

Specify the slab fastener type codelist value.

Shear Diaphragm Status

Type **SDS Valid**.

Angle

Displays the angle at which the slab is placed from the plane or reference plane.

Slope

Type the default slope for the slab.

Bound Slope Direction

Specifies the boundaries slope direction. Select **0**. This property is used by the software when importing slabs using CIMsteel. To change the options on the list, edit the **Slab Reference Direction** select list in Catalog.

Bound Proj Direction

Type **0**. This property is used by the software when importing slabs using CIMsteel.

Thickening Direction

Type **0**. This property is used by the software when importing slabs using CIMsteel.

Layers

The **Structure > Objects > Slabs > Layers** node defines the individual layers of slabs that you want to place. When creating your layers, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

For each layer part class type that you define, you must have the following required attributes defined.

Part Number

Type a part number for the layer. The part number must be unique across the entire catalog.

Part Description

Type a description for the layer.

Continuity

Enter the continuity codelist value for this layer.

Material

Enter a description of the layer material.

Grade

Enter the material grade of the layer.

Thickness

Enter the thickness of the layer.

SubInterface Name

Enter the interface name.

See Also

Define New Slab Layer Part (on page 241)
Define New Wall Layer Part (on page 244)

Stairs

The **Stairs** node defines the stairs that you want to add to your catalog and hence to your model. The stairs that are delivered are samples. Do not directly edit the sample stairs to create your custom stairs. We recommend that you copy the sample stair to a new stair, and then edit the copy.

When creating your stairs, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*).

The required attributes used by IJSPSCommonStairLadderProperties interface must be defined for each stair part class that you define. The required attributes are:

Part Number

Type a part number for the stair. The part number must be unique across the entire catalog.

Part Description

Type a description for the stair.

Mirror Behavior Option

Specify the mirror behavior of the stair part.

Span

Enter the distance from the top support to the bottom support. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the stair.

Height

Enter the overall projected vertical height, including custom extensions or gaps on the top or bottom. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the stair.

Length

Enter the overall physical length for reporting purposes. This is the default distance. The actual distance is calculated by the ISPSStairSymbolServices component when placing the stair.

Width

Enter the horizontal width of the stair. This is the default distance that is displayed on the ribbon bar during placement.

Angle

Enter the angle of inclination from the bottom support. This is the default angle that is displayed on the ribbon bar during placement.

Step Pitch

Enter the maximum distance between the stair treads. This is the default distance that is displayed on the ribbon bar during placement.

Side

Enter 1 or 0. This attribute is a toggle for the placement side relative to the top support. The **Side** button on the ribbon bar toggles the value so the default setting is inconsequential.

Walls

The **Structure > Objects > Walls** node defines the walls that you want to add to your catalog and hence to your model.

Before defining walls, you must define the layers that you plan to use to compose your walls in the **Layers** node. For more information, see *Layers* (on page 583).

After defining your layers, you define the compositions of your walls in the **Wall Composition** node, see *Define New Wall Composition Part* (on page 245). When the compositions are defined, you can then define your walls in the **Wall General** node, see *Define New Wall General Part* (on page 245).

See Also

Define New Wall Composition Part (on page 245)
Define New Wall General Part (on page 245)
Define New Wall Layer Part (on page 244)
Define New Wall Layer Part Class (on page 244)

Wall Composition

The **Wall Composition** node   defines the combination of layers that you want to use in your wall. Before defining the combinations in this sheet, you must define the layers that you plan to use.

When creating your walls, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide.*)

Part Number

Enter a unique identification for the combination. This identification must be unique across the entire catalog.

Part Description

Enter a description for the combination.

Layer Number

Specify the number of layers that this combination will have.

Reference Layer Number

Specify the layer on which more or less thickness is placed when you update the total thickness of the wall.

Position

Enter the position number to specify the location where the cross section of the wall aligns with the wall path. Refer to the wall's cross-section to determine the position locations.

Horizontal Offset

Defines the distance from the wall path to the defined position on the cross section. A zero offset always puts the position on the path. You can enter a positive or a negative value to position the wall on either side of the path.

Vertical Offset

Defines the vertical distance from the wall path to the defined position on the cross section. A zero offset always puts the position on the path. You can enter a positive or a negative

value to position the wall above or below the path.

Cross Section

Enter the cross section name and dimensions.

Thickness

Enter the wall thickness in millimeters.

Height

Enter the wall height in millimeters.

Layer Type #

For each layer in the combination, enter the sheet name in the **StructWallLayer.xls** workbook that contains the layer that you want to specify. For example, in the delivered **StructWallLayer.xls** sample workbook there are two sheets: **WallConcrete** and **WallLayer**. If you wanted to use a layer defined in the **WallConcrete** sheet, you would enter that sheet name in this column.

Layer Part Number #

For each layer in the combination, enter the layer part number as specified on sheet you specified in **Layer Type #** column in the **StructWallLayer.xls** workbook.

Member Cross Sections

Member cross-section symbols are used in the Structure task.

All section tables delivered with the software use a specific set of cross-section symbols. Some section tables use all the cross-section symbols in the set; some tables only use a subset of the cross-section symbols. Each cross-section symbol has its own set of properties. When looking at a section table workbook, you can determine the cross-section symbol that is being referenced by that particular sheet by looking at the SymbolDefinition entry at the top of the sheet.

The cross-section symbols are delivered with the reference data software in the *[Reference Data Folder]*\SharedContent\CrossSections folder. You can create your own custom cross-section symbols, sometimes referred to as arbitrary sections, using the 2D Symbols utility that is delivered with the software.

The software uses the simple physical representation of the cross-section symbol to display the member geometry in the model. You can change the display representation using the **Selected Aspects** option of **Format** > **View**.

The delivered symbols contain a detailed physical representation. This representation is available only for marine models, and is not used for plant and materials handling models.

The delivered symbols also contain a production physical representation. This representation is available only for marine models in the Structural Manufacturing task, and is not used for plant and materials handling models.

For more information, see *Cross-Section Symbol Representations* in the *2D Symbols User's Guide.*

NOTE Your customized symbols do not need to specify a detailed physical representation and only require the interfaces and parameters listed below. The software uses the simple

physical shape to calculate the volume and surface area of the member. If you need more accurate calculations, include fillets in the simple physical representation.

Required Interfaces

- IStructCrossSection

- IStructCrossSectionDimensions

Optional Interfaces

- IStructCrossSectionDesignProperties (only for CentroidX,Y to get Cardinal Point 10 unless the symbol is symmetric and does not specify it in the parameter map)

- IStructCrossSectionUnitWeight (needed for unit weight reports)

- IStructAngleBoltGage, IstructFlangedBoltGage (only for the **Vessel Framing** command that positions using these values)

IStructFlangedSectionDimensions (needed for kdetail/kdesign)

StructWallLayer Workbook

The **StructWallLayer.xls** workbook defines the individual layers of walls that you want to place. When creating your layers, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide*.)

For each layer part class type that you define, you must have the following required attributes defined.

Part Number

Type a part number for the layer. The part number must be unique across the entire catalog.

Part Description

Type a description for the layer.

Continuity

Enter the continuity for this layer.

Material

Enter a description of the layer material.

Grade

Enter the material grade of the layer.

Thickness

Enter the thickness of the layer.

SubInterface Name

Enter the interface name.

Wall General Type

The **Wall General** node   defines the walls that you want in your catalog. When creating your walls, there are custom attributes and required attributes. You can add your custom attributes using the Custom Interfaces sheet (described in the *Reference Data Guide.*)

Before defining walls in this sheet, you must define the layer combinations in the **Wall Composition Type** node .

Part Number

Enter a part number for the wall. This identification must be unique across the entire catalog.

Part Description

Enter a description for the wall.

Name Rule

Specify the name rule that you want to use to name this wall.

Priority

Specify the priority codelist value.

Continuity

Specify the continuity codelist value.

Composition

Enter the layer composition that you want to use. You must define these compositions in the **Wall Composition** node.

Boundary Offset Reference

Specifies the boundary offset reference codelist value.

Boundary Offset

Enter the default boundary offset distance. If needed, you can change the offset during placement,

Bearing

Enter **True** if the wall is a load bearing wall. Enter **False** if the wall is not a load bearing wall.

Layers

The **Structure > Objects > Walls > Layers** node defines the individual layers of walls that you want to place.

For each layer part class type that you define, you must have the following required attributes defined.

Part Number

Type a part number for the layer. The part number must be unique across the entire catalog.

Part Description

Type a description for the layer.

Continuity

Enter the continuity codelist value for this layer.

Material

Enter a description of the layer material.

Grade

Enter the material grade of the layer.

Thickness

Enter the thickness of the layer.

SubInterface Name

Enter the interface name.

See Also

Define New Slab Layer Part (on page 241)
Define New Wall Layer Part (on page 244)

Fireproofing Insulation Specification

The **Structure > Object Specifications > Insulation > Fireproofing** node defines the insulation specifications used in the **Structure** task's **Place Fireproofing** Command 🗗.

Specification Name

Defines the insulation specification name. All insulation specification names should be unique.

Specification Description

Describes the insulation specification.

Purpose

Defines the purpose of the insulation specification. The insulation specification purpose is defined in the **StructInsulationPurpose** select list in Catalog.

Material Name

Defines the insulation material. This material is defined in Catalog in the **Structure > Materials > Properties** node.

Material Grade

Specifies the object material grade. To change the options on the list, edit the **Structure > Materials > Properties** node in Catalog.

Thickness

Defines the insulation thickness.

Encasement Rule

Defines the encasement rules that this insulation specification must use. Encasement rules are defined in Catalog in the **Structure > Objects > Insulation > Fireproofing** node or in the **StructMemberFireproofing** workbook.

Fireproofing Rating

Defines the time for which the fireproofing is rated.

Shapes

This section lists all the section libraries that are available in the Catalog. All cross-sections that are available in each library are listed below. Not all libraries will use all the cross-sections that are listed.

Cross Section Symbol 2L

The **2L** cross section symbol defines double-angle sections and uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length, pound per foot (lbm/ft).

Area

Type the cross-sectional area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth for the section (longer legs). The depth is defined in inches or millimeters.

d

Type the other depth for the section (shorter legs). The depth is defined in inches or millimeters.

bf

Type the width of a single angle. The width is defined in inches or millimeters.

Width

Type the width of the entire section. The width is defined in inches or millimeters.
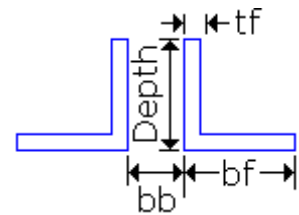
Perimeter

Type the outside perimeter of the section.

tf

Type the flange thickness for the section. The thickness is defined in inches or millimeters.

tw

Type the web thickness for the section. The thickness is defined in inches or millimeters.

kdesign

Type the distance from outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

bb

Enter the back-to-back spacing on the section.

CentroidY

Type the centroid location along the y-axis. The location is defined in inches or millimeters.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant.

bb Configuration

Specifies which legs of the angles are placed back-to-back. Type **0** for equal leg angle. Type

1 to place the long legs back-to-back. Type **2** to place the short legs back-to-back.

lsg
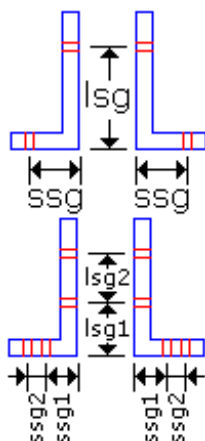
Specify the bolt gage for the long side when there is one bolt row. For more information, see *Member Cross Sections* (on page 581).

lsg1

Specify the gage distance to the first bolt row on the long side when there are two bolt rows.

lsg2

Specify the gage distance between the first and second bolt rows on the long side when there are two bolt rows.

ssg

Specify the bolt gage for the short side when there is one bolt row.

ssg1

Specify the gage distance to the first bolt row on the short side when there are two bolt rows.

ssg2

Specify the gage distance from the first bolt row to the second bolt row on the short side when there are two bolt rows.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUBoxFM

The BUBoxFM symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length, pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters.

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

> Type the width of the top flange.

Top Flange Thickness

> Type the thickness of the top flange.

Bottom Flange Width

> Type the width of the bottom flange.

Bottom Flange Thickness

> Type the thickness of the bottom flange.

Web Thickness

> Type the thickness of the web.

Offset Left Web Top

> Type the offset distance for the top left web.

Offset Right Web Top

> Type the offset distance for the top right web.

Offset Left Web Bot

> Type the offset distance for the bottom left web.

Offset Right Web Bot

> Type the offset distance for the bottom right web.

CentroidX

> Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

> Type the vertical distance from designated member edge to the centroidal axis.

Ixx

> Type the moment of inertia for the section's local x-axis.

Zxx

> Type the plastic section modulus for the section's local x-axis.

Sxx

> Type the section modulus for the section's local x-axis.

Rxx

> Type the radius of gyration for the section's local x-axis.

Iyy

> Type the moment of inertia for the section's local y-axis.

Zyy

> Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, whether or not the cross-section is symmetrical about the x-axis depends on dimensional values.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, whether or not the cross-section is symmetrical about the y-axis depends on dimensional values.

🗏 NOTE Symmetries about the x- and y-axes are defined by design properties only. The **Flange Width Extension** (top and bottom) property is not a design property; therefore, the symmetry calculation is not affected by this property. This non-affect can cause discrepancies between the symmetry of the cross-section graphic and the **IsSymmetricAlongX** and **IsSymmetricAlongY** properties when non-zero width extensions are defined.

Cross Section Symbol BUC

The BUC symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

> The outside perimeter distance for the section.

Top Flange Width

> Type the width of the top flange.

Top Flange Thickness

> Type the thickness of the top flange.

Bottom Flange Width

> Type the width of the bottom flange.

Bottom Flange Thickness

> Type the thickness of the bottom flange.

Web Thickness

> Type the thickness of the web.

Offset Web Top

> Type the offset distance for the top web.

Offset Web Bot

> Type the offset distance for the bottom web.

CentroidX

> Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

> Type the vertical distance from designated member edge to the centroidal axis.

Ixx

> Type the moment of inertia for the section's local x-axis.

Zxx

> Type the plastic section modulus for the section's local x-axis.

Sxx

> Type the section modulus for the section's local x-axis.

Rxx

> Type the radius of gyration for the section's local x-axis.

Iyy

> Type the moment of inertia for the section's local y-axis.

Zyy

> Type the plastic section modulus for the section's local y-axis.

Syy

> Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, whether or not the cross-section is symmetrical about the x-axis depends on dimensional values.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, whether or not the cross-section is symmetrical about the y-axis depends on dimensional values.

Cross Section Symbol BUCan

The BUCan symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Tube Thickness

Type the plate thickness of the main tube plate.

Tube Diameter

Type the diameter of the main tube.

Diameter Start

Type the cone diameter at the can start.

Diameter End

Type the cone diameter at the can end.

Length Start Cone

Type the start cone length. You can also enter any negative number to indicate this length should be 1/3 of the total length.

Length End Cone

Type the end cone length. You can also enter any negative number to indicate this length should be 1/3 of the total length.

Cone 1 Thickness

Type the plate thickness for the cone closest to the start of the member.

Cone 1 Material

Type the plate material for the cone closest to the start of the member.

Cone 1 Grade

Type the plate material grade for the cone closest to the start of the member.

Cone 2 Thickness

Type the plate thickness for the cone closest to the end of the member.

Cone 2 Material

Type the plate material for the cone closest to the end of the member.

Cone 2 Grade

Type the plate material grade for the cone closest to the end of the member.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

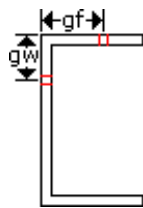Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.

IsSymmetricAlongX

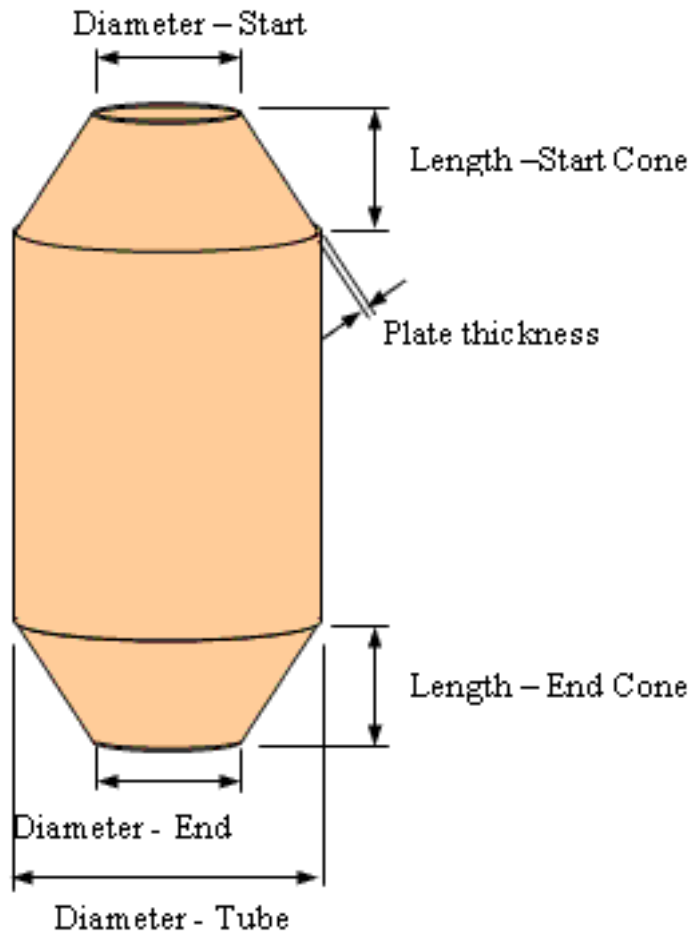Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUCone

The BUCone symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Cone Thickness

Type the plate thickness of the cone plate.

Diameter Start

Type the cone diameter at the start.

Diameter End

Type the cone diameter at the end.

Length Start Cone

Type the start cone length. You can also enter any negative number to indicate this length should be 1/3 of the total length.

Length End Cone

Type the end cone length. You can also enter any negative number to indicate this length should be 1/3 of the total length.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUEndCan

The BUEndCan symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot

(lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Tube Thickness

Type the plate thickness of the main tube plate.

Tube Diameter

Type the diameter of the main tube.

Diameter Cone

Type the cone diameter.

Cone Length

Type the start cone length. You can also enter any negative number to indicate this length should be 1/3 of the total length.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

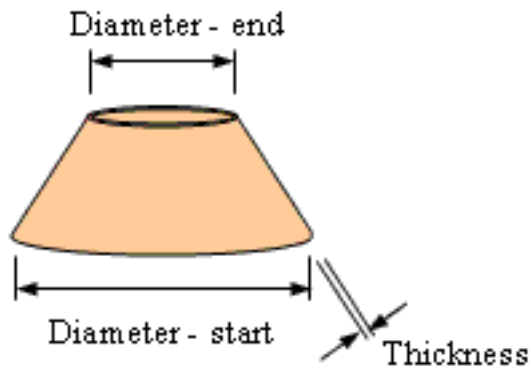Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

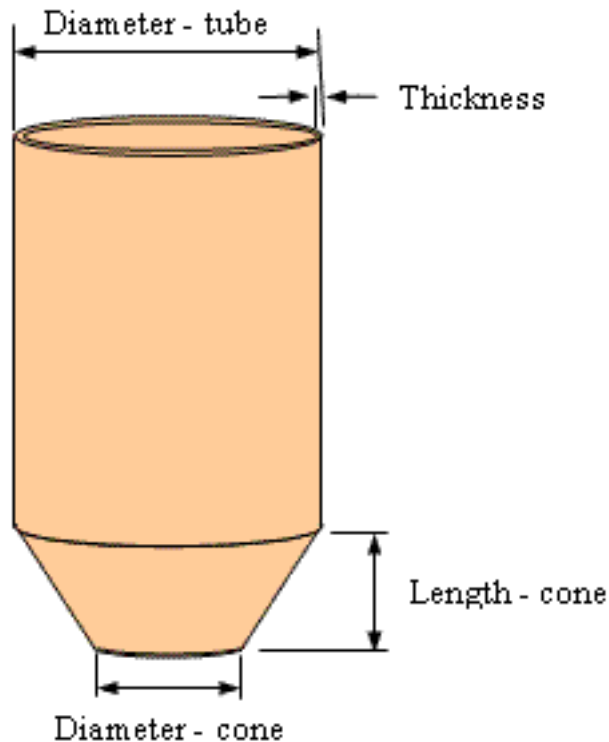Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUFlat

The BUFlat symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Web Thickness

Type the thickness of the top flange.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
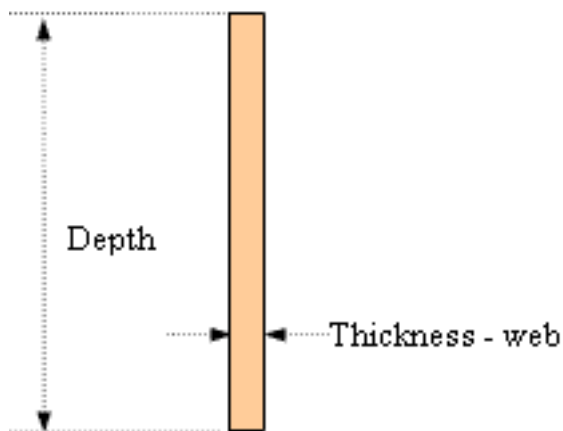
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUI

The BUI symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

Type the width of the top flange.

Top Flange Thickness

Type the plate thickness of the top flange.

Web Thickness

Type the thickness of the top flange.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

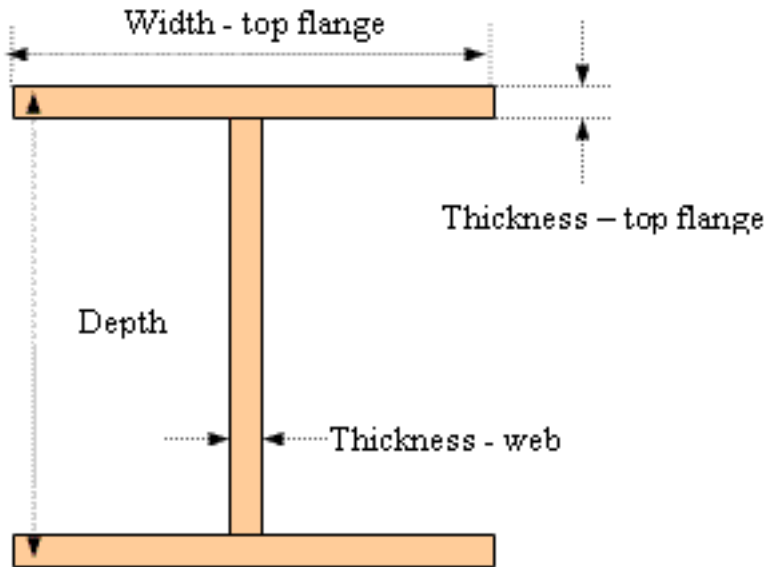Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUIHaunch

The BUIHaunch symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters.

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

Type the width of the top flange.

Top Flange Thickness

Type the plate thickness of the top flange.

Bottom Flange Width

Type the width of the top flange.

Bottom Flange Thickness

Type the plate thickness of the top flange.

Length Start

Type the distance from the start of the member to where the haunch transition should start. You can enter any negative number to indicate the distance should be 1/3 of the member length.

Depth Start

Type the web depth at the start of the member.

Depth End

Type the web depth at the end of the member.

Depth Haunch

Type the web depth at the haunch.

Length End

Type the distance from the end of the member to where the haunch transition should end. You can enter any negative number to indicate the distance should be 1/3 of the member length.

Transition Gradient Start

Type the slope of the start transition.

Transition Gradient End

Type the slope of the end transition.

Web Thickness

Type the thickness of the top flange.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

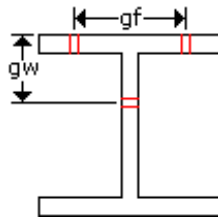**J**

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
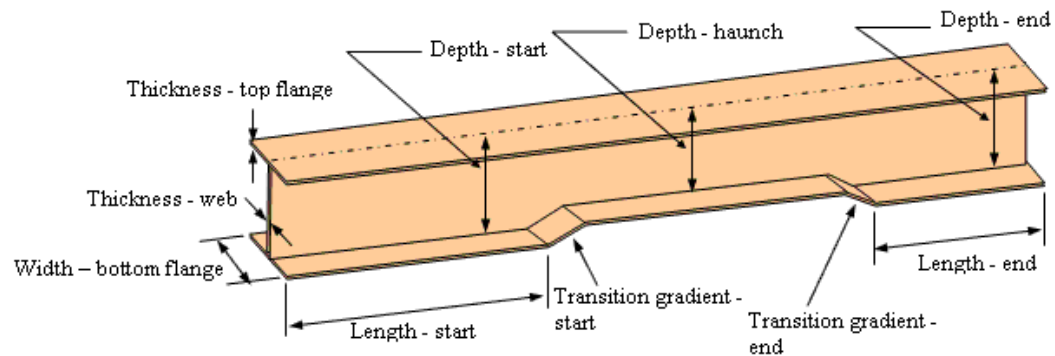
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, whether or not the cross-section is symmetrical about the x-axis depends on dimensional values.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

📄 **NOTE** Symmetries about the x- and y-axes are defined by design properties only. The **Flange Width Extension** (top and bottom) property is not a design property; therefore, the symmetry calculation is not affected by this property. This non-affect can cause discrepancies between the symmetry of the cross-section graphic and the **IsSymmetricAlongX** and **IsSymmetricAlongY** properties when non-zero width extensions are defined.

Cross Section Symbol BUITaperWeb

The BUITaperWeb symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

Type the width of the top flange.

Top Flange Thickness

Type the plate thickness of the top flange.

Bottom Flange Width

Type the width of the top flange.

Bottom Flange Thickness

Type the plate thickness of the top flange.

Web Thickness

Type the thickness of the top flange.

Depth Start

Type the web depth at the start of the member.

Depth End

Type the web depth at the end of the member.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, whether or not the cross-section is symmetrical depends on dimensional values.
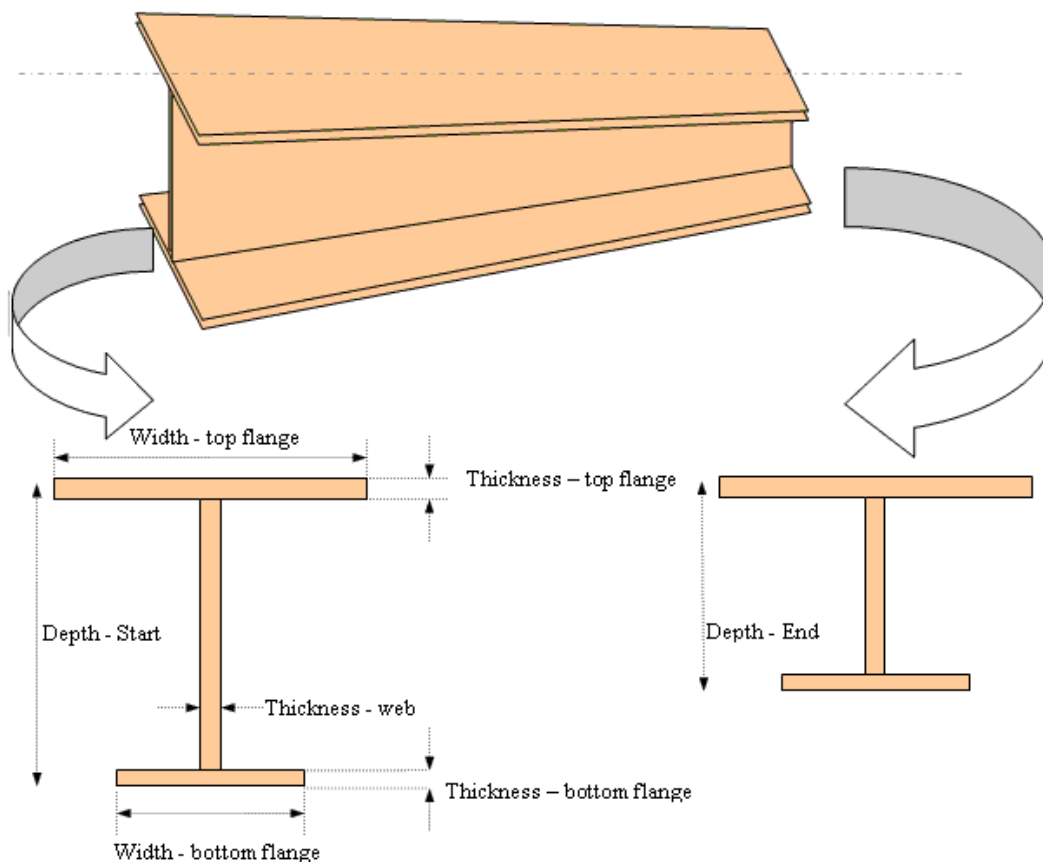
IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

📝 NOTE Symmetries about the x- and y-axes are defined by design properties only. The

Flange Width Extension (top and bottom) property is not a design property; therefore, the symmetry calculation is not affected by this property. This non-affect can cause discrepancies between the symmetry of the cross-section graphic and the **IsSymmetricAlongX** and **IsSymmetricAlongY** properties when non-zero width extensions are defined.

Cross Section Symbol BUIUE

The BUIUE symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

Type the width of the top flange.

Top Flange Thickness

Type the plate thickness of the top flange.

Bottom Flange Width

Type the width of the top flange.

Bottom Flange Thickness

Type the plate thickness of the top flange.

Web Thickness

Type the thickness of the top flange.

Depth Start

Type the web depth at the start of the member.

Depth End

Type the web depth at the end of the member.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, whether or not the cross-section is symmetrical about the x-axis depends on dimensional values.
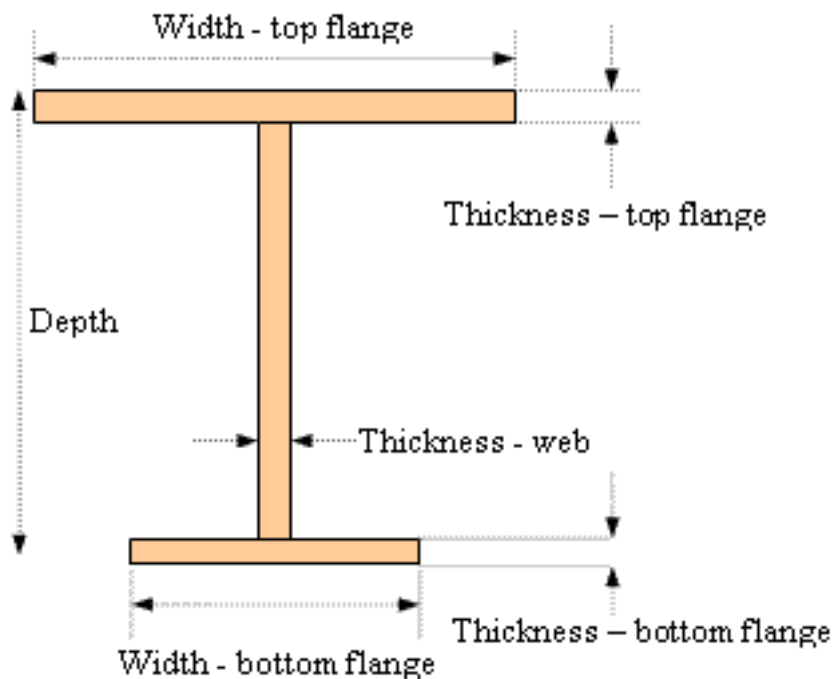
IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

NOTE Symmetries about the x- and y-axes are defined by design properties only. The **Flange Width Extension** (top and bottom) property is not a design property; therefore, the symmetry calculation is not affected by this property. This non-affect can cause discrepancies between the symmetry of the cross-section graphic and the **IsSymmetricAlongX** and **IsSymmetricAlongY** properties when non-zero width extensions are defined.

Cross Section Symbol BUL

The BUL symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Bottom Flange Width

Type the width of the top flange.

Bottom Flange Thickness

Type the plate thickness of the top flange.

Web Thickness

Type the thickness of the top flange.

Depth Start

Type the web depth at the start of the member.

Depth End

Type the web depth at the end of the member.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

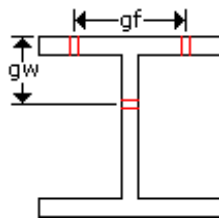**J**

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

lsg

Specify the bolt gage for the long side when there is one bolt row.

lsg1

Specify the gage distance to the first bolt row on the long side when there are two bolt rows.

lsg2

Specify the gage distance from the first bolt row to the second bolt row on the long side when there are two bolt rows.

ssg

Specify the bolt gage for the short side when there is one bolt row.

ssg1

Specify the gage distance to the first bolt row on the short side when there are two bolt rows.

ssg2

Specify the gage distance from the first bolt row to the second bolt row on the short side when there are two bolt rows.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section,

whether or not the cross-section is symmetrical about the y-axis depends on dimensional values.

Cross Section Symbol BUT

The BUT symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Top Flange Width

Type the width of the top flange.

Top Flange Thickness

Type the plate thickness of the top flange.

Web Thickness

Type the thickness of the top flange.

Depth Start

Type the web depth at the start of the member.

Depth End

Type the web depth at the end of the member.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H
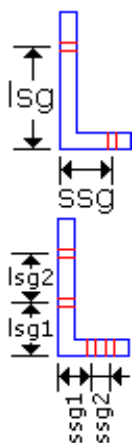
Type the flexural constant for the section.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

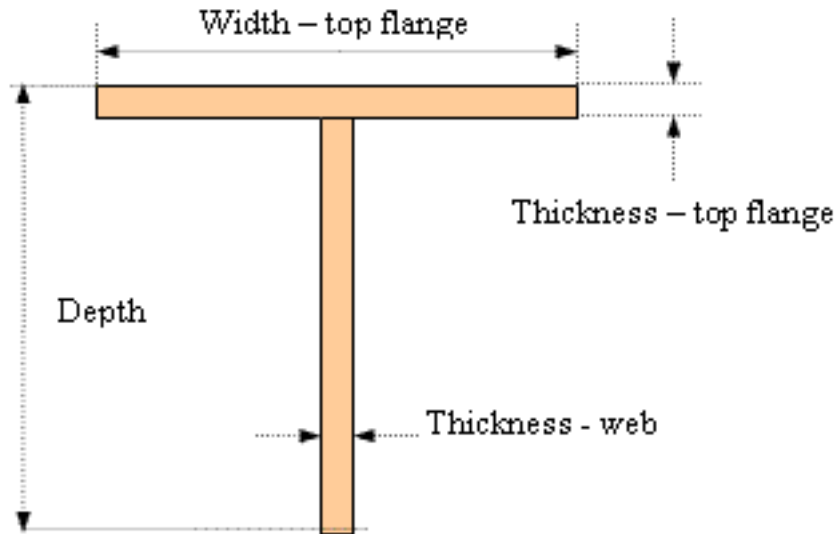Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol BUTube

The BUTube symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

Tube Thickness

Type the plate thickness of the tube plate.

Tube Diameter

Type the diameter of the tube.

CentroidX

Type the vertical distance from designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.
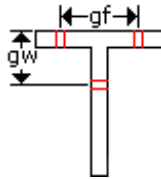
J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.
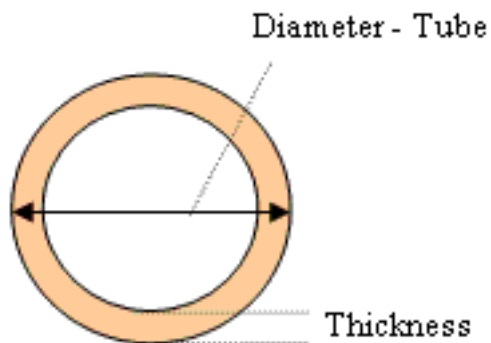
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.
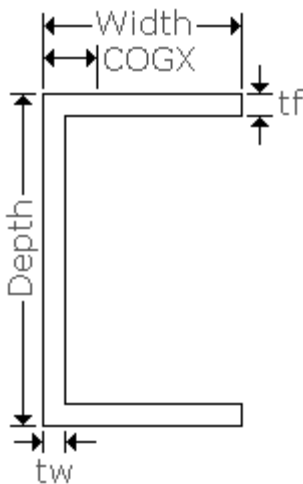
IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol C (MC)

The **C** cross-section symbol defines channel sections and uses the following properties. The **C** symbol is also used for MC cross-sections.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-sectional area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth for the section. The depth is defined in inches or millimeters.

Width

Type the flange width for the section. The width is defined in inches or millimeters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section. The depth is defined in inches or millimeters.

bf

Type the flange width for the section. The width is defined in inches or millimeters.

tw

Type the web thickness for the section. The thickness is defined in inches or millimeters.

tf

Type the flange thickness for the section. The thickness is defined in inches or millimeters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the centroid location along the x-axis. The location is defined in inches or millimeters.

eo_x

Type the shear center location along the x-axis. The location is defined in inches or millimeters.

xp

Type the horizontal distance from the designated edge of member to its plastic neutral axis (PNA). The distance is defined in inches or millimeters.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant in LRFD Specification Equation E3-1.
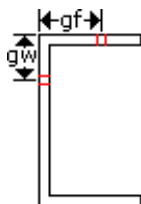
gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **False**.

Cross Section Symbol CS

The **CS** cross section symbol defines solid round sections and uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-sectional area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth of the section.

Width

Type the width of the section.

Perimeter

Type the outside perimeter distance for the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
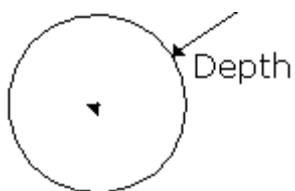
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol HP

The **HP** cross section symbol uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section.

Group Id

Type the material group identification for the section.

Unit Weight

Type the nominal weight of the section. The unit weight is defined in mass per length, pound per foot (lbm/ft).

Area

Type the cross-sectional area for the section. The area is defined in square inches or square millimeters.

Depth

Type the overall depth for the member (longer legs for angles). The depth is defined in inches or millimeters.

Width

Type the flange width. The width is defined in inches or millimeters.

Perimeter

Type the outside perimeter distance of the shape.

d

Type the other depth for the section (shorter legs). The depth is defined in inches or millimeters.

bf

Type the flange width. The width is defined in inches or millimeters.

tw

Type the web thickness. The thickness is defined in inches or millimeters.

tf

Type the flange thickness. The thickness is defined in inches or millimeters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

Fy3p

Type the theoretical maximum yield stress (F'").

Ixx

Type the moment of inertia about the x-axis.

Zxx

Type the plastic section modulus about the x-axis.

Sxx

Type the elastic section modulus about the x-axis.

Rxx

Type the radius of gyration about the x-axis.

Iyy

Type the moment of inertia about the y-axis.

Zyy

Type the plastic section modulus about the y-axis.

Syy

Type the elastic section modulus about the y-axis.

Ryy

Type the radius of gyration about the y-axis.

J

Type the torsional moment of inertia.

Cw

Type the warping constant.

Wno

Type the normalized warping function.

Sw

Type the warping statical moment.

Qf

Type the statical moment at point in flange.

Qw

Type the statical moment at mid-depth of the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
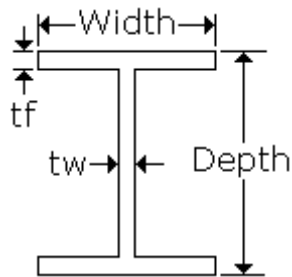
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol HSSC (Pipe)

The **HSSC** cross section symbol defines circular, hollow structural sections and uses the following properties. The **HSSC** symbol is also used for Pipe cross-sections.

Section Name

Type the section name. This name appears when labeling members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth of the section.

Width

Type the width of the section.

Perimeter

The outside perimeter distance for the section.

tnom

Type the nominal wall thickness of the section.

tdes

Type the design wall thickness of the section.

D_t

Type the ratio of the diameter to the thickness.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.
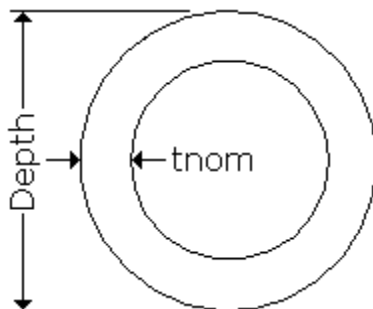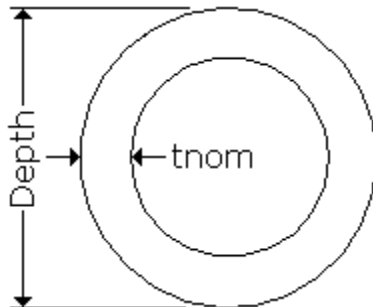
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol HSSCs

The **HSSC** cross section symbol defines circular, hollow structural sections and uses the following properties. The **HSSC** symbol is also used for Pipe cross-sections.

Section Name

Type the section name. This name appears when labeling members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth of the section.

Width

Type the width of the section.

Perimeter

The outside perimeter distance for the section.

tnom

Type the nominal wall thickness of the section.

tdes

Type the design wall thickness of the section.

D_t

Type the ratio of the diameter to the thickness.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Has Seam

Specify if the cross-section has a seam indicator or not. For this cross-section, the default value is **True** (1).
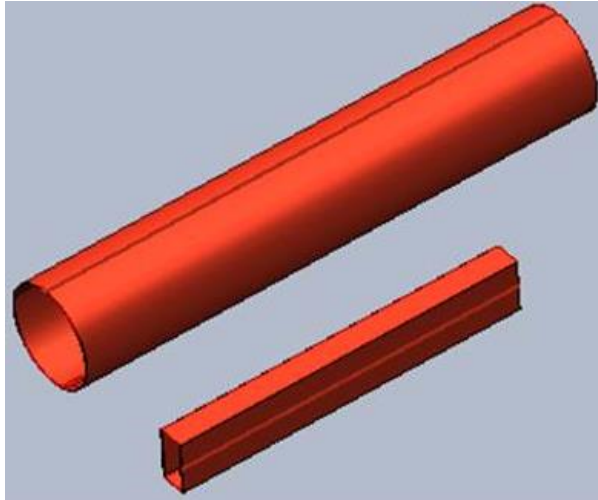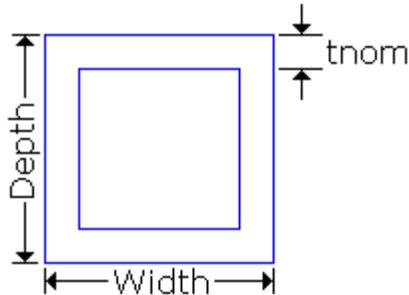

Seam Angle

Defines the location of the seam. This angle is measured clockwise from orientation vector of the member looking down the member from the start end.
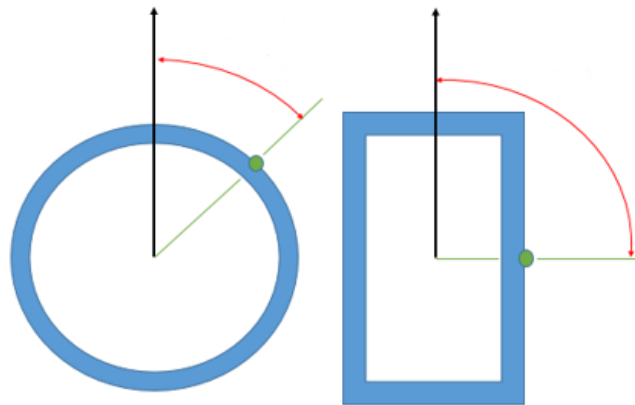
Cross Section Symbol HSSR

The **HSSR** cross section symbol defines rectangular, hollow, structural sections and uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches and square millimeters.

Depth

Type the overall depth of the section.

Width

Type the width for the section. The width is defined in inches or millimeters.

Perimeter

The outside perimeter distance for the section.

tnom

Type the nominal wall thickness of the section.

tdes

Type the design wall thickness of the section.

b_t

Type the width to thickness ratio of the section.

h_t

Type the height to thickness ratio of the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True** (1).
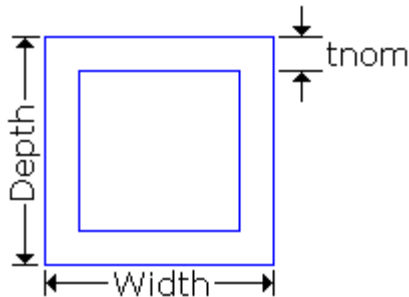
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True** (1).

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True** (1).

Cross Section Symbol HSSRs

The **HSSRs** cross section symbol defines rectangular, hollow, structural sections with a seam indicator and uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches and square millimeters.

Depth

Type the overall depth of the section.

Width

Type the width for the section. The width is defined in inches or millimeters.

Perimeter

The outside perimeter distance for the section.

tnom

Type the nominal wall thickness of the section.

tdes

Type the design wall thickness of the section.

b_t

Type the width to thickness ratio of the section.

h_t

Type the height to thickness ratio of the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **True** (1).

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True** (1).

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True** (1).
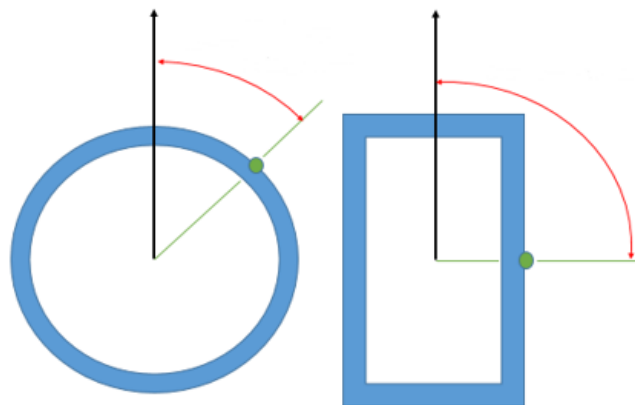
Has Seam

Specify if the cross-section has a seam indicator or not. For this cross-section, the default

value is **True** (1).
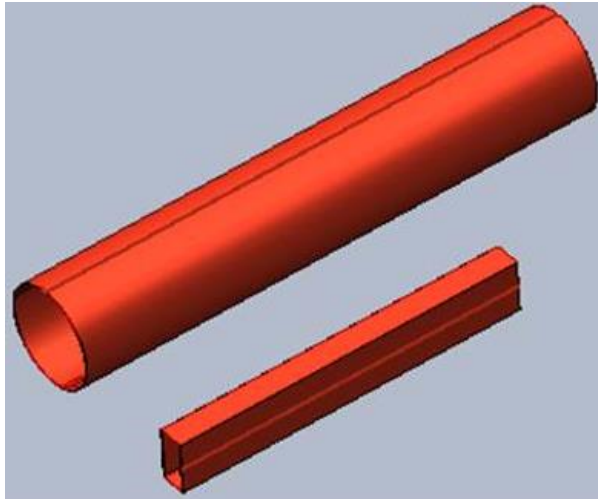
Seam Angle

Defines the location of the seam. This angle is measured clockwise from orientation vector of the member looking down the member from the start end.

Cross Section Symbol HW

The **HW** symbol uses the following properties.
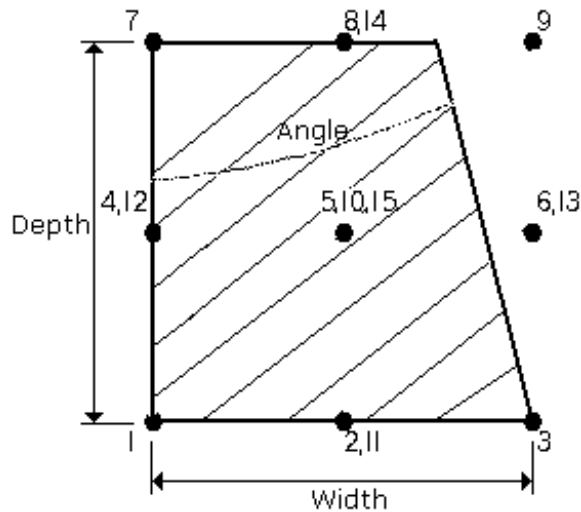
Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Angle

Define the angle.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol HWWF

The **HWWF** symbol uses the following properties.
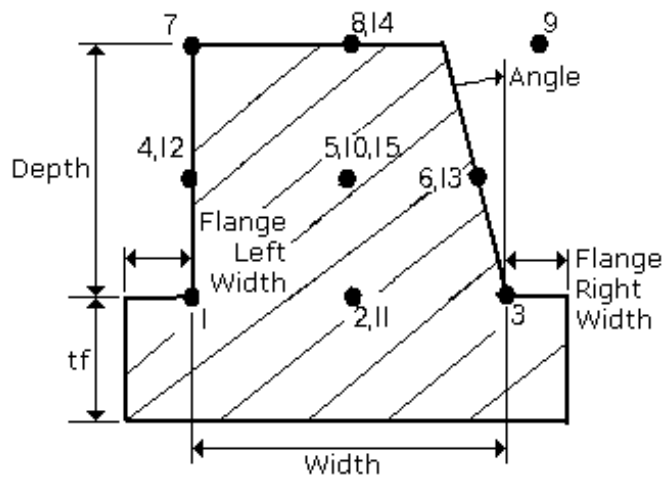
Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Angle

Define the angle.

Flange Right Width

Define the flange width on the right side.

Flange Left Width

Define the flange width on the left side.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

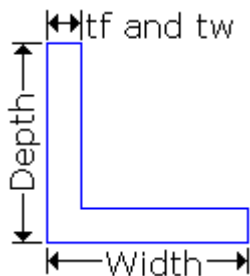Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol L

The **L** cross section symbol uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches or square millimeters.

Depth

Type the depth for the section. The depth is defined in inches or millimeters.

Width

Type the breadth for the section. The breadth is defined in inches or millimeters.

Perimeter

The outside perimeter distance for the section.

d

Type the overall depth (longer leg) for the section. The depth is defined in inches or millimeters.

bf

Type the overall width (shorter leg) for the section. The width is defined in inches or millimeters.

tf

Type the flange thickness for the section. The thickness is defined in inches or millimeters.

tw

Type the web thickness for the section. The thickness is defined in inches or millimeters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the location of the centroid along the local x-axis. The location is defined in inches or millimeters.

CentroidY

Type the location of the centroid along the local y-axis. The location is defined in inches or

millimeters.

xp

Type the distance from the designated edge of angle to its plastic neutral axis (PNA) along the local x-axis.

yp

Type the distance from the designated edge of angle to its plastic neutral axis (PNA) along the local y-axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

Rxy

Type the radius of gyration about the local z-axis. The radius is defined in inches or millimeters.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.
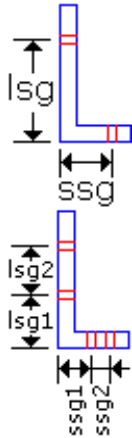
lsg

Specify the bolt gage for the long side when there is one bolt row.

lsg1

Specify the gage distance to the first bolt row on the long side when there are two bolt rows.

lsg2

Specify the gage distance from the first bolt row to the second bolt row on the long side when there are two bolt rows.

ssg

Specify the bolt gage for the short side when there is one bolt row.

ssg1

Specify the gage distance to the first bolt row on the short side when there are two bolt rows.

ssg2

Specify the gage distance from the first bolt row to the second bolt row on the short side when there are two bolt rows.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
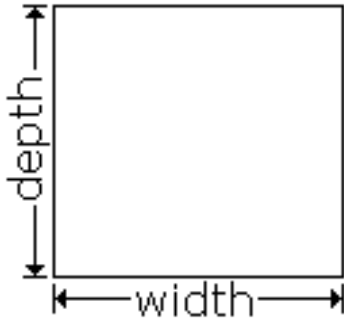
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **False**.

Cross Section Symbol Rect

The **Rect** symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

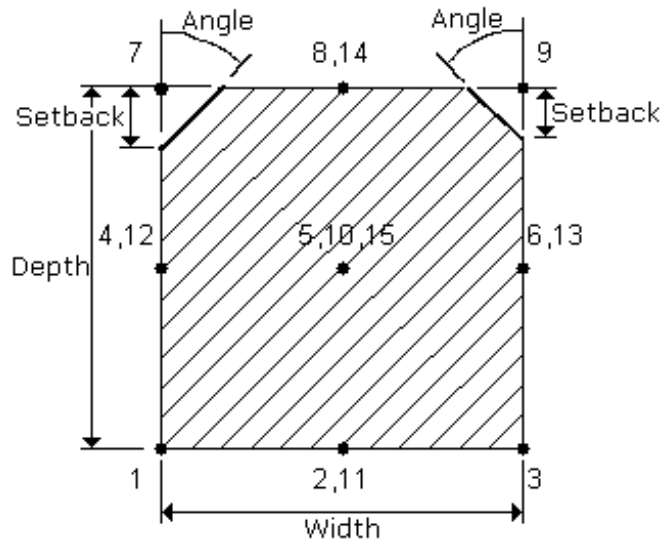Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

> Type the flexural constant for the section.

Cross Section Symbol RectC

The **RectC** symbol uses the following properties.

Section Name

> Type the section name. The section name must be unique within the section standard.

Short Name

> Type the short name for the section.

EDI Name

> Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

> Type the material group identification for the section.

Angle

> Define the angle.

Setback

> Define the setback. This value is defined in meters.

Unit Weight

> Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

> Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

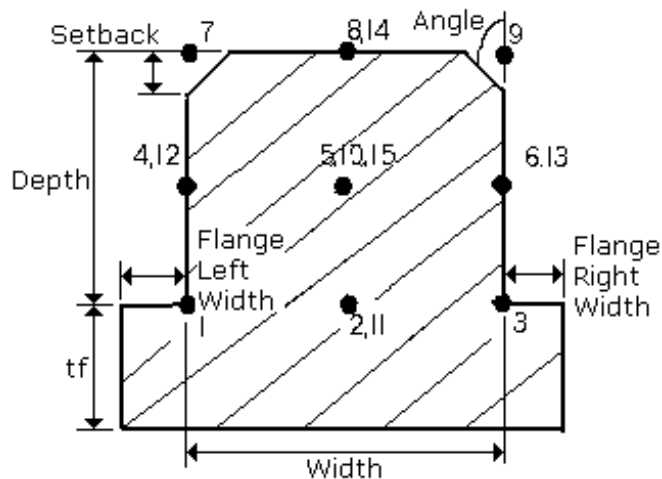Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol RectCWF

The **RectCWF** symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Angle

Define the angle.

Setback

Define the setback. This value is defined in meters.

Flange Right Width

Define the flange width on the right side. This valve is defined in meters.

Flange Left Width

Define the flange width on the left side. This valve is defined in meters.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw
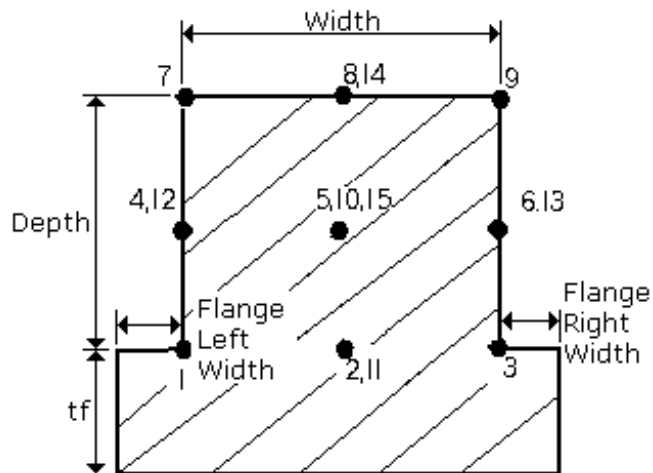
Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol RectWF

The **RectWF** symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Flange Right Width

Define the flange width on the right side. This valve is defined in meters.

Flange Left Width

Define the flange width on the left side. This valve is defined in meters.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

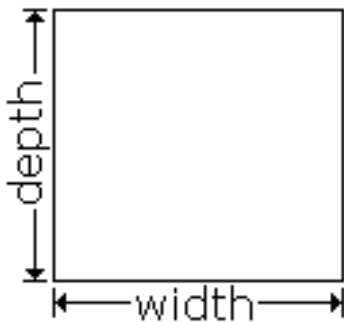Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol RS

The **RS** cross section symbol defines rectangular solids and uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section. The area is defined in square inches and square millimeters.

Depth

Type the depth for the section. The depth is defined in inches or millimeters.

Width

Type the breadth for the section. The breadth is defined in inches or millimeters.

Perimeter

Type the outside perimeter distance for the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
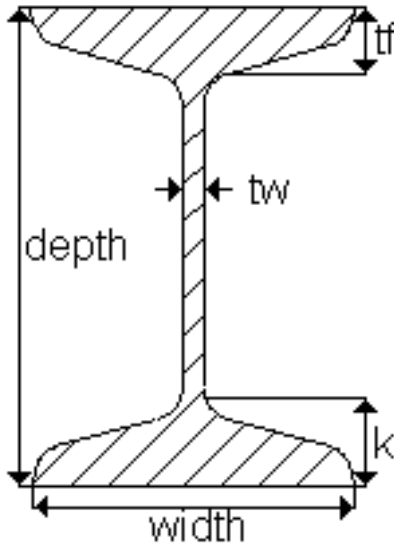
IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol S

The **S** cross section symbol uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in inches.

Width

Type the flange width for the section. The width is defined in inches.

Perimeter

The outside perimeter distance for the section.

d

Type the overall depth for the section.

bf

Type the overall width for the section.

tw

Type the web thickness for the section. The thickness is defined in inches.

tf

Type the flange thickness for the section. The thickness is defined in inches.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

Fy3p

Type the maximum yield for the compact web for the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

Wno

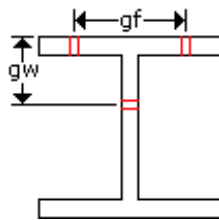Type the normalized warping function. The function is defined in square inches or square millimeters.

S$_w$

Type the warping statical moment. The moment is defined in in^4 or mm^4.

Qf

Type the first moment of area for the flange.

Qw

Type the first moment of area for the web.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol ST

The **ST** cross section symbol uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in inches.

Width

Type the flange width for the section. The width is defined in inches.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in inches.

tf

Type the flange thickness for the section. The thickness is defined in inches.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidY

Type the distance to the centroid along the local y-axis. This distance is defined in inches or millimeters.

yp

Type the distance from the designated edge of angle to its plastic neutral axis along the local y-axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

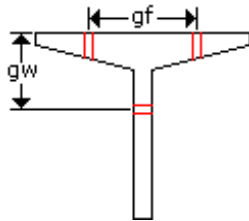Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

> Type the polar radius of gyration about the shear center.

H

> Type the flexural constant for the section.

gf

> Type the bolt gage for the flange.

gw

> Type the bolt gage for the web.

IsHollow

> Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.
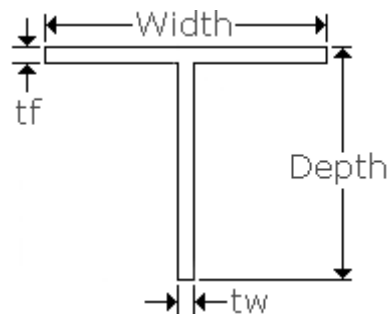
IsSymmetricAlongX

> Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

> Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol T (MT)

> The **T** cross-section symbol uses the following properties. The **T** symbol is also used for MT cross-sections.

Section Name

> Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in inches.

Width

Type the flange width for the section. The width is defined in inches.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in inches.

tf

Type the flange thickness for the section. The thickness is defined in inches.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidY

Type the vertical distance from designated member edge to the centroidal axis.

yp

Type the distance from designated edge of angle to its plastic neutral axis along the local y-

axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is

False.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol W (M)

The **W** symbol uses the following properties. The **W** symbol is also used for M cross-sections.
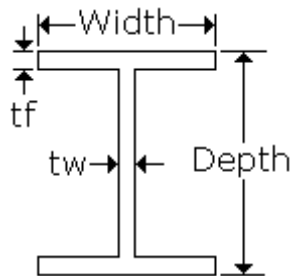
Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

Alternate EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in inches.

Width

Type the flange width for the section. The width is defined in inches.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in inches.

tf

Type the flange thickness for the section. The thickness is defined in inches.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

Fy3p

Type the maximum yield stress for the section.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

Wno

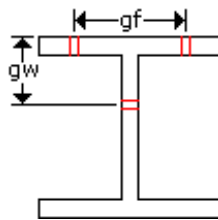Type the normalized warping function. The function is defined in square inches or square millimeters.

S$_w$

Type the warping statical moment. The moment is defined in in^4 or mm^4.

Qf

Type the first moment of area for the flange.

Qw

Type the first moment of area for the web.

gf

Type the bolt gage for the flange.

gw

Type the bolt gage for the web.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **True**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

Cross Section Symbol Wedge

The **Wedge** symbol uses the following properties.
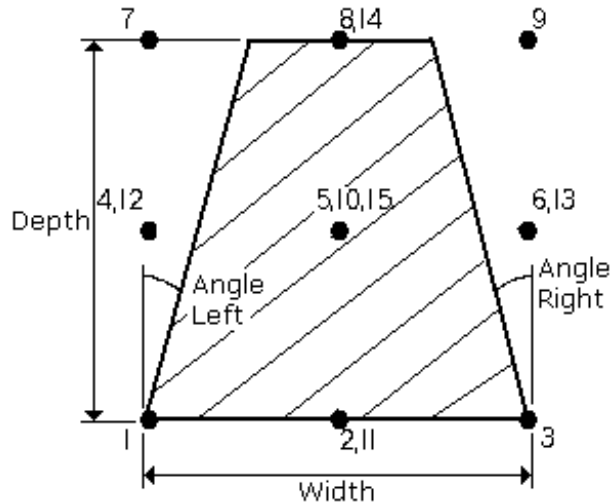
Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Angle Right

Define the angle on the right side of the web.

Angle Left

Define the angle on the left side of the web.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

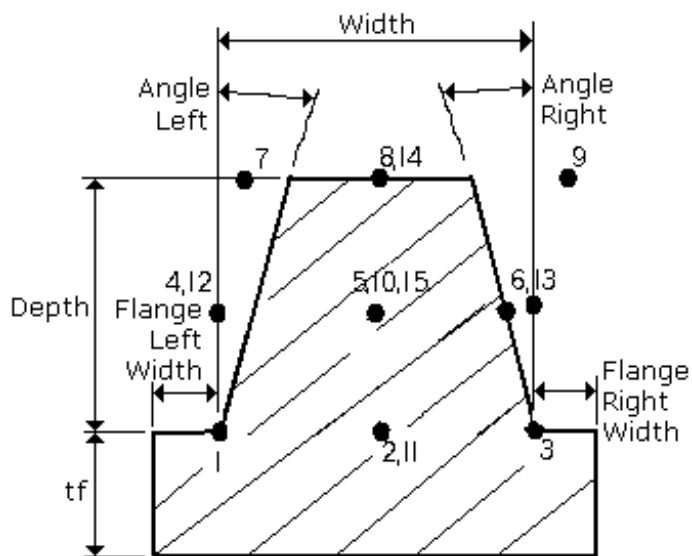Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol WedgeWF

The **WedgeWF** symbol uses the following properties.

Section Name

Type the section name. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section. This name is used when translating sections through CIMsteel. This property is currently not used.

Group Id

Type the material group identification for the section.

Angle Right

Define the angle on the right side of the web.

Angle Left

Define the angle on the left side of the web.

Flange Right Width

Define the flange width on the right side.

Flange Left Width

Define the flange width on the left side.

Unit Weight

Type the weight of the section. The unit weight is defined in mass per length pound per foot (lbm/ft).

Area

Type the cross-section area for the section.

Depth

Type the depth for the section. The depth is defined in meters

Width

Type the width for the section. The width is defined in meters.

Perimeter

The outside perimeter distance for the section.

d

Type the depth for the section.

bf

Type the width for the section.

tw

Type the web thickness for the section. The thickness is defined in meters.

tf

Type the flange thickness for the section. The thickness is defined in meters.

kdesign

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

CentroidX

Type the horizontal distance from the designated member edge to the centroidal axis.

CentroidY

Type the vertical distance from the designated member edge to the centroidal axis.

Ixx

Type the moment of inertia for the section's local x-axis.

Zxx

Type the plastic section modulus for the section's local x-axis.

Sxx

Type the section modulus for the section's local x-axis.

Rxx

Type the radius of gyration for the section's local x-axis.

Iyy

Type the moment of inertia for the section's local y-axis.

Zyy

Type the plastic section modulus for the section's local y-axis.

Syy

Type the section modulus for the section's local y-axis.

Ryy

Type the radius of gyration for the section's local y-axis.

J

Type the torsional moment of inertia for the section.

Cw

Type the warping constant for the section.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant for the section.

Cross Section Symbol WT

The **WT** cross section symbol uses the following properties.

Section Name

Type the section name. This name appears when you label members. The section name must be unique within the section standard.

Short Name

Type the short name for the section.

EDI Name

Type the Electronic Data Interchange name for the section.

Group Id

Type the material group identification for the section.

Unit Weight

Type the nominal weight of the section. The unit weight is defined in mass per length, pound per foot (lbm/ft).

Area

Type the cross-sectional area for the section. The area is defined in square inches or square millimeters.

Depth

Type the overall depth for the member (longer legs for angles). The depth is defined in inches or millimeters.

Width

Type the flange width. The width is defined in inches or millimeters.

Perimeter

Type the outside perimeter distance of the shape.

d

Type the overall depth of the section (longer legs for angles). The depth is defined in inches or millimeters.

bf

Type the flange width. The width is defined in inches or millimeters.

tw

Type the web thickness. The thickness is defined in inches or millimeters.

tf

Type the flange thickness. The thickness is defined in inches or millimeters.

kdesign

(for design) Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on the welded section.

kdetail

(for detail) Type the distance from the outer face of the flange to the web toe of the fillet of the rolled shape or the equivalent distance on welded section.

Ixx

Type the moment of inertia about the x-axis.

Zxx

Type the plastic section modulus about the x-axis.

Sxx

Type the elastic section modulus about the x-axis.

Rxx

Type the radius of gyration about the x-axis.

Iyy

Type the moment of inertia about the y-axis.

Zyy

Type the plastic section modulus about the y-axis.

Syy

Type the elastic section modulus about the y-axis.

Ryy

Type the radius of gyration about the y-axis.

J

Type the torsional moment of inertia.

Cw

Type the warping constant.

CentroidY

Type the centroid Y dimension.

yp

Type the vertical distance from the designated member edge to the plastic neutral axis.

ro

Type the polar radius of gyration about the shear center.

H

Type the flexural constant.

IsHollow

Specify if the cross-section is hollow or not. For this cross-section, the default value is **False**.

IsSymmetricAlongX

Specify if the cross-section is symmetrical along the local x-axis. For this cross-section, the default value is **False**.

IsSymmetricAlongY

Specify if the cross-section is symmetrical along the local y-axis. For this cross-section, the default value is **True**.

XML Schema for Cross Section Editor

Creating or editing the cross section properties using the Cross Section Editor are controlled by C*rossSectionTypeProperties.xml* delivered with the Reference Data Setup to *[Product Folder]\[Product Reference Data Folder]*\SharedContent\XML\Structure folder. In order to create a new part class under specific cross-section type, you need to define the part class and its properties in the XML file.

NOTE If you copy an existing part class by clicking **Copy From** in **New Class** dialog box, ensure that it has its entry in the XML. For example if you choose to create a copy of W cross-section, the **Name** and **Display Name** are generated as **Copy of W** by default. You can also rename the section **Name**. Ensure that this name has its entry in the XML.

General cross-section information:

- The **CrossSectionTypes** namespace differentiates the properties of different cross-section types.

- **CrossSectionType** section defines the entire cross-section part class including input and output properties.

- **Name** value specifies the name of the cross section part class. For example, W, WT and so forth.

- **CalculatorProgID** value specifies the ProgID for the class that calculates cross-section properties. S3D provides a default section calculator SectionLibraryCalculator.sln, delivered to [Product Reference Data Folder]\SharedContent\Src\RefData\Rules\SectionLibraryCalculator. You can customize the default calculator or provide the ProgID of the custom calculator.

Example:

```
<CrossSectionTypes xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns="urn:crosssection-schema"
xsi:schemaLocation="urn:crosssection-schema
CrossSectionTypeProperties.xsd">>
<CalculatorProgID>SectionLibraryCalculator,Ingr.SP3D.ReferenceData.Clie
nt.Services.CalculateSectionProperties</CalculatorProgID>
```
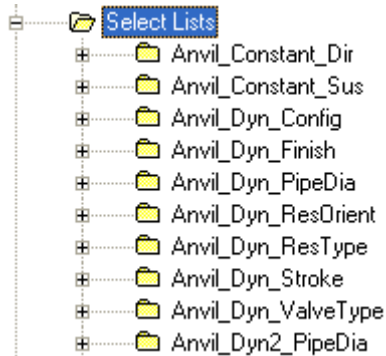
```
      <CrossSectionType>
          <Name>W</Name>
      </CrossSectionType>
</CrossSectionTypes>
```

Inputs:

This section specifies the properties necessary to define a cross-section and calculate the design properties for the same.

- **Property** section holds the data related to the input.

- **Name** value specifies the name of the input property. For example, Section Name, Depth, Width, Flange Thickness and so forth.

- **InterfaceName** indicates the name of the interface on which the **Name** is declared.

- **ContentType** value specifies the type of the cross-section such as Material, Thickness and Grade. This property is optional.mandatory in case the cross-section is built-up.

- **DependsOn** specifies if the property is dependent on any other cross-section **Type**. In the below example, **TopFlangeThickness** property depends on **TopFlangeMaterial** and **TopFlangeGrade**.

Example:

```
<Inputs>
  <Property>
    <Name>TopFlangeThickness</Name>
<InterfaceName>IUABuiltUpTopFlange</InterfaceName>
    <ContentType>Thickness</ContentType>
    <DependsOn>
      <Property>
        <Name>TopFlangeMaterial</Name>
<InterfaceName>IUABuiltUpTopFlange</InterfaceName>
        <ContentType>Material</ContentType>
      </Property>
      <Property>
        <Name>TopFlangeGrade</Name>
<InterfaceName>IUABuiltUpTopFlange</InterfaceName>
        <ContentType>Grade</ContentType>
      </Property>
    </DependsOn>
  </Property>
</Inputs>
```

Properties:

- **Property** section holds the data related to the output.

- **Name** value specifies the name of the output property. For example Area, Perimeter UnitWeight and so forth.

- **InterfaceName** indicates the name of the interface on which the **Name** is declared.

- **IsCalculated** value indicates whether or not the property is calculated. **True** indicates that the calculations are available in the calculator class; **False** indicates that there are no calculations. If **IsCalculated** is true, then the property is read only. If it is false then you can edit the property while creating the cross-section.

Example:

```
<Properties>
      <Property>
            <Name>Area</Name>

      <InterfaceName>IStructCrossSectionDimensions</InterfaceName>
            <IsCalculated>true</IsCalculated>
      </Property>
</Properties>
```

New CalculatorProgID

To create a new .NET project for customized calculations and to evaluate the cross section properties, use the **ISectionCalculator** interface. This interface uses a method named CalculateCrossSectionProperties. You can create the required logic for calculating the properties. On compiling this method generates an assembly.

The ProgID for this generated project uses the following xml format:

AssemblyName,Namespace.ClassName

Example:

```
<CalculatorProgID>SectionLibraryCalculator,Ingr.SP3D.ReferenceData.Clie
nt.Services.CalculateSectionProperties</CalculatorProgID>
```

Appendix: Select Lists (Codelists)

This appendix contains information about the select lists that you see under the main Select Lists node in the tree view. The select lists in this appendix are listed in alphabetical order.

TIP Select lists are called codelists in the delivered bulkload workbooks. A select list number is the same thing as a codelist number.

Select Lists
- Anvil_Constant_Dir
- Anvil_Constant_Sus
- Anvil_Dyn_Config
- Anvil_Dyn_Finish
- Anvil_Dyn_PipeDia
- Anvil_Dyn_ResOrient
- Anvil_Dyn_ResType
- Anvil_Dyn_Stroke
- Anvil_Dyn_ValveType
- Anvil_Dyn2_PipeDia

A select list (codelist) is a set of predefined acceptable values for a particular attribute. For example, the **Fluid Code** list defines all the acceptable fluid names that you can use. You can only select fluids that are defined in the **Fluid Code** list. Generally, each entry in a list has a unique number to identify that value, a short description, and a long description. Depending on where the software is using the list, you can select the short description to select the list item. However, when defining parts and piping specification rules, you may be required to identify the list item that you want by using the list number.

The delivered select lists can be categorized into these types: simple, hierarchical, and system.

- Simple - Map numbers with descriptions.

- Hierarchical - Group the mappings in multiple levels. If you set a lower-level value in this type of select list, all values above this level are also set. For example, in the **Equipment Types** select list, if you set ProcessEqTypes5 to 370, the higher-level values are also set: ProcessEqTypes4 to 360, ProcessEqTypes3 to 325, and so forth.

- System - Contain values that users must not change.

You can modify most select lists to reflect your own practices, terminology, and language. You can make revisions to a select list set by editing the **AllCodeLists.xls** workbook (or other select list workbook) and then bulk loading. You can also add or edit select lists in the Catalog task.

IMPORTANT When you add an entry to a select list, the number for the entry must be between 10,000 - 40,000. Numeric values less than 10,000 and greater than 40,000 are reserved for use by the software.

Here are some important points to remember about deleting and modifying select lists. You cannot delete a select list after it is loaded into the Catalog database. However, you can delete values in certain select lists. The Bulkload utility supports delete and replace for select lists.

You can rename select lists. The name for a select list corresponds to the column name on the sheet, not necessarily the sheet name in the workbook. The name for each select list must be unique in the database.

You can edit the lowest level in a hierarchical select list, but you must not edit any higher levels in the select list. You can edit simple select lists (without a hierarchy) unless otherwise specified on the sheet.

NOTES

- For quick links to all the select lists, see the **Index** sheet in the **AllCodeLists.xls** workbook.

- The namespace for user-defined select lists is UDP. This designation is placed in the **CodeListTableNamespace** column on the **Custom Interfaces** sheet. For more information about select lists and namespaces, see *Select List (Codelist) Namespaces* (on page 696).

- The limit for select list names is 205 characters for Microsoft SQL Server and 210 characters for Oracle databases. You cannot use blanks or special characters in these names.

- The limit for the long and short descriptions in a select list is 255 characters.

- All values in the short description column for a select list must be unique for that list.

- For more information on naming limitations, see Appendix: Name Limitations in Reference Data in the *Reference Data Guide*.

Select List (Codelist) Column Descriptions

The select lists have several fields, or columns, in common. Hierarchical select lists can have more than one pair of short and long description columns.

Short Description

Specifies the short description of the entry. The maximum length of this description is 255 characters.

★ IMPORTANT All values in the short description column must be unique for that select list.

Long Description

Specifies the long description of the entry. The maximum length of this description is 255 characters.

Codelist Number

Specifies an identification number for each row in the sheet. When you want to use the data defined in a row, type the number associated with that row. All numbers in this column must be unique in this codelist.

Sort Order

Sorts the modified and added codelist values. If the **Sort Order** value matches the valueID of an existing codelist value, the modified or added codelist value is placed in front of the matching codelist value. If there is no match, a modified codelist value's position does not change, and an added codelist value is placed at the end of the list of codelist values.

NOTE To modify the order of the entries, open the Catalog task, and expand the **Select Lists** node. Then, use the **Move Up** and **Move Down** keys on the toolbar to adjust the order of the items.

Select List (Codelist) Disciplines

The following table lists the sheets in the **AllCodeLists.xls** workbook and their associated disciplines.

Sheet	Discipline
Align Component	HVAC
Aspect Code	All
Assembly Inclusion	Piping
Automated Flange Selection Option	Piping
Auxiliary Treatment	Piping
Bend To Bend Tangent Basis	Piping
Bolt Diameter Equivalence Option	Piping
Bolt Extension Option	Piping
Bolt Length Calculation Option	Piping
Bolt Length Round Off Option	Piping
Bolt Lubrication Requirements	Piping
Bolt Option	Piping
Bolt Requisition Classification	Piping
Bolt Thread Designation	Piping
Bolt Type	Piping
Bolting Requirements	Piping
Branch Reporting Ownership	Piping
Cable Route Status	Electrical (Cable)
Cable Tray Component Type	Electrical (Cable Tray)
Cable Tray Materials	Electrical (Cable Tray)
Cable Tray Part Data Basis	Electrical (Cable Tray)

Sheet	Discipline
Cable Tray Type	Electrical (Cable Tray)
Cable Type	Electrical (Cable)
Cap Screw Length Round Off Option	Piping
Catalog Units of Measure Basis	Piping
Clamp Option	Piping
Clamp Requirement	Piping, Electrical
Clamp Selection Basis	Piping
Cleaning Requirement	Multiple: Piping, Equipment
Cleaning Responsibility	Multiple: Piping, Electrical, Equipment, Structure
Coating Color	Multiple: Piping, Equipment, Structure
Coating Type	Multiple: Piping, Equipment, Structure
Commodity Code Builder Option	Piping
Commodity Option	Piping
Conduit Selection Basis	Electrical (Conduit)
Connection Type	Piping
Construction Type	Multiple: Piping, Equipment, integration
Control Point Subtype	Common
Control Point Type	Common
Create Exclusive WBS Item	All
Cross Section Cardinal Points	Structure
Cross Section Edges	Structure
Cross Section Shape Types	HVAC
Design Responsibility	Multiple: Electrical, Equipment, Hanger and Supports, Structure

Sheet	Discipline
Design Standard	Multiple: Piping, Equipment
Door Frame Position	Structure
Door Type	Structure
Doors Windows Kinematics	Structure
Drilling Template Pattern	Piping
Eccentric Offset Basis	Piping
EFW Correlation Approval Status	Integration
Elevation Plane Type	Grids
EMI	Electrical
EMI Radiator	Electrical
EMI Suceptor	Electrical
End Preparation	Multiple: Piping, Equipment
End Standard	Multiple: Piping, Electrical (Conduit), Equipment
Environmental Zone	Multiple: Piping, Equipment
Equipment Component Types	Equipment
Equipment Symbol Errors	Equipment
Equipment Types	Equipment
Examination	Piping
Exterior Surface Treatment	Piping
External Welded Pipe Part	Hangers and Supports
Fabrication Responsibility	Multiple: Piping, Electrical, Equipment, Structure
Fabrication Type	Multiple: Piping, Electrical (Conduit), Equipment
Fabrication Type Basis	Piping
Feature Type	Multiple: Piping, Electrical (Conduit)

Sheet	Discipline
Fireproofing Exposure Type	Structure
Fireproofing Method	Structure
Fireproofing Type	Structure
Flange Face Surface Finish	Piping
Flange Facing	Piping
Flange Insulation Kit Type	Piping
Flexible Hose Topology Type	Piping
Flip Component	HVAC
Flow Direction	Piping
Fluid Code	Piping
Front End Type	Equipment
Gasket Inside Diameter Basis	Piping
Gasket Option	Piping
Gasket Outside Diameter Basis	Piping
Gasket Requirement Override	Piping
Gasket Requirements	Piping
Gasket Selection Based on Fluid Code	Piping
Gasket Selection for Mismatched Bolted Ends Option	Piping
Gasket Style Number	Piping
Gasket Type	Piping
Geometric Industry Standard	Piping
Geometry Type	Piping
Grid Plane Type	Grids

Sheet	Discipline
Handrail Connection Type	Structure
Handrail End Treatment	Structure
Handrail Inline Connection Type	Structure
Handrail Offset	Structure
Handrail Orientation	Structure
Handrail Side Connection Type	Structure
Hand Wheel Orientation	Piping
Hazardous Fluid Category	Multiple: Piping, Equipment
Header Branch Size Basis Option	Piping
Heat Tracing Medium	Multiple: Piping, Equipment
HngSup Associated Part Type	Hangers and Supports
HngSup Association Type	Hangers and Supports
HngSup BOM Type	Hangers and Supports
HngSup Bounding Box Type	Hangers and Supports
HngSup Class Node Type	Hangers and Supports
HngSup Command	Hangers and Supports
HngSup Connection Type	Hangers and Supports
HngSup Connect Obj	Hangers and Supports
HngSup Cut Type	Hangers and Supports
HngSup Discipline	Hangers and Supports
HngSup ET Type	Hangers and Supports
HngSup Face Selection Type	Hangers and Supports
HngSup Joint Type	Hangers and Supports
HngSup Manufacturer	Hangers and Supports

Sheet	Discipline
HngSup Mating Joint Type	Hangers and Supports
HngSup Part Class Type	Hangers and Supports
HngSup Physical Connection	Hangers and Supports
HngSup Port Category	Hangers and Supports
HngSup Port Type	Hangers and Supports
HngSup Rule Type	Hangers and Supports
HngSup Strict Face Selection	Hangers and Supports
HngSup Support Type	Hangers and Supports
HngSup Type Selection Rule	Hangers and Supports
HVAC Component Types	HVAC
HVAC Lining Material	HVAC
HVAC Part Data Basis	HVAC
HVAC Part Generation Basis	HVAC
HVAC Width and Depth Basis	HVAC
Icarus Column Base Option	Space Management
Icarus Concrete Type	Space Management
Icarus Exclude End Bent	Space Management
Icarus Grating Type	Space Management
Icarus Pipe Rack Type	Space Management
Icarus Struct Steel Analysis	Space Management
Icarus Third Column	Space Management
IFC Aspect Code Value	Interference Checking
IFC Process Status	Interference Checking
IFC Required Action	Interference Checking

Sheet	Discipline
IFC Type	Interference Checking
Ignore Boundaries	All
Industry Commodity Code Option	Piping
Inlet Port Geometry Type	Piping
Installation Responsibility	Multiple: Piping, Electrical, Equipment, Hangers and Supports, Structure
Instrument Functional Type	Piping
Insulation Material	Multiple: Piping, Equipment, HVAC
Insulation Purpose	Multiple: Piping, Equipment
Insulation Temperature Basis	Piping
Insulation Thickness Basis	Multiple: Piping, Equipment
Interior Surface Treatment	Multiple: Piping, Electrical (Conduit)
Is Bend Planar	Piping
Jacketed Closure Method	Piping
Jacketed Piping Basis	Piping
Lining Material	Piping
Load Span Classification	Electrical (Cable Tray)
Loose Material Requirements	Piping
Mach Bolt Length Round Off Option	Piping
Manufacturer	Piping
Manufacturing Method	Piping
Map Type	Drawings and Reports
Materials Grade	Piping
Materials Description Builder Option	Piping

Sheet	Discipline
Materials of Construction Class	Piping
Materials Type	Piping
Member Orientation	Structure
Methods of Jacket Pipe Construction	Piping
Methods of Trimming	Piping
Min Bend To Bend Tangent Len Option	Piping
Mirror Behavior Option	Multiple: Piping, Equipment
Misc Requisition Classification	Piping
Multiport Valve Op Req	Piping
Note Purpose	All
Nozzle Entrance Type	Multiple: Piping, integration
Nozzle Flange Type	Multiple: Piping, integration
Nozzle Function	Multiple: Piping, integration
Nut Creation Option	Piping
Nut Option	Piping
Nut Type	Piping
Open or Blind Spacer Install State	Piping
Orifice Flange Tap Orientation	Piping
Outlet Port Geometry Type	Piping
Painting Responsibility	Multiple: Piping, Electrical, Equipment, Hangers and Supports, Structure
Part Class Types	All
Part Data Basis	Piping
Part Data Source	Piping

Sheet	Discipline
Pipe Bend Radius By User Option	Piping
Pipe Bend Radius Multiplier Option	Piping
Pipe Bend Type	Piping
Pipe Bending Machine Type	Piping
Pipe Stock Usage	Piping
Piping Commodity Catalog Part Number Basis Option	Piping
Piping Commodity Override Option	Piping
Piping Commodity Procurement Data Option	Piping
Piping Commodity Type	Multiple: Piping, Catalog
Piping Point Usage	Piping
Piping Spec Status	Piping
Piping Spec Version Management Option	Piping
Piping Specification Notes Option	Piping
Plane of Flip	HVAC
Plane of Turn	HVAC
Pressure Rating	Piping
Property Categories	All
Purchase Length Basis Option	Piping
Rear End Type	Equipment and Furnishings
Reference Plane View Directions	Structure
Report Piping Commodity Basis	Piping
Reporting Requirement Basis	Piping
Reporting Type	Multiple: Piping, Equipment, Hangers and Supports, Structure

Sheet	Discipline
Requisition Responsibility	Multiple: Piping, Electrical, Equipment, Hangers and Supports, Structure
Requisition Type	Multiple: Piping, Equipment
Respect Assembly Boundaries	Piping
Revision History Notes Option	Piping
Ring Number	Piping
Rotation Offset Type	Grids
Route Direction	Space Management
Route Layout	Space Management
Route on Face	Space Management
Schedule Thickness	Piping
Selection Basis	Piping
Selection Basis per PCF	Piping
Short Code Hierarchy	Piping
Signal Type	Electrical
Size Reduction Preference	Piping
Size Reduction Type	Piping
Slab Boundary Reference	Structure
Slab Composition	Structure
Slab Continuity	Structure
Slab Corner Type	Structure
Slab Cross Section Symbol	Structure
Slab Direction Reference	Structure
Slab Face Position	Structure

Sheet	Discipline
Slab Fastener Type	Structure
Slab Layer Role	Structure
Slab Manufacturing Process	Structure
Slab Nosing Material	Structure
Slab Nosing Type	Structure
Slab Priority	Structure
Slab Reference Direction	Structure
Spectacle Position	Piping
Spool Break by Control Point	Piping
Spool Include Welded Parts	Piping
Spool Sequence Type	Piping
Spooling Basis	Piping
Steamout Requirement	Multiple: Piping, Electrical (Conduit)
Stress Relief	Piping
Stress Relief Requirement	Piping
Struct 2L Back to Back Rule	Structure
Struct AC Left Right Both	Structure
Struct AC Pad Type	Structure
Struct AC Sizing Rule	Structure
Struct AC Splice Types	Structure
Struct Alignment	Structure
Struct Boundary Conditions	Structural Analysis
Struct Can Diameter Rule	Structure
Struct Can Length Compute Method	Structure

Sheet	Discipline
Struct Can Type	Structure
Struct Compute Rule	Structure
Struct Cone Length Compute Method	Structure
Struct Continuity	Structure
Struct Coord Sys Reference	Structure
Struct Custom Plate Part Type	Structure
Struct End Releases	Structure
Struct Feature Radius Type	Structure
Struct FC Chevron WPO	Structure
Struct FC End Controlling	Structure
Struct FC Offset Along	Structure
Struct FC Offset Direction	Structure
Struct FC Supported Edge	Structure
Struct FC Supporting CPs	Structure
Struct FC Supporting Side	Structure
Struct Footing Comp Sizing Rule	Structure
Struct Frm Conn Position Ref	Structure
Struct Insulation Encasement	Structure
Struct Insulation Purpose	Structure
Struct Member End Selection Rule	Structure
Struct Member Position Rule	Structure
Struct Prismatic Footing Shapes	Structure
Struct Insulation Setback Ref	Structure
Struct Wall Boundary Size	Structure

Sheet	Discipline
Struct Wall Boundary Type	Structure
Struct Wall Connection Type	Structure
Struct Wall Reference Attribute	Structure
Structural Load Case Source	Structure
Structural Member Priority	Structure
Structural Member Type	Structure
Structural WPO Intersection Index	Structure
Supplementary Nut Requirement	Piping
Supplementary Washer Requirement	Piping
Supply Responsibility	Multiple: Piping, Electrical, Equipment, Hangers and Supports, Structure
Surface Preparation	Piping
Tap End Stud Bolt Length Roundoff Option	Piping
Tech Delivery Conditions	Piping
Testing Responsibility	Multiple: Piping, Electrical, Equipment, Hangers and Supports, Structure
Testing Type	Piping
Tightness	Piping
Tray Specification Type	Electrical (Cableway)
Type	Piping
Undefined Service Limits Rule Option	Piping
Valve Flow Pattern	Piping
Valve Model Number	Piping
Valve Operator Geometric Industry Standard	Piping
Valve Operator Is Rotatable	Piping

Sheet	Discipline
Valve Operator Part Data Basis	Piping
Valve Operator Type	Piping
Valve Port Option	Piping
Valve Trim	Piping
Vendor	Piping
Vessel Head Type	Equipment
Voltage Grade	Electrical (Cable)
Washer Creation Option	Piping
Washer Option	Piping
Washer Type	Piping
WBS Assignment	All
WBS Auto Grouping Rule Type	All
WBS Item Purpose	All
WBS Project Purpose	All
WBS Pull In Associated Items	All
Welding Procedure Specification	Piping
Weld Type	Piping
Welding Requirement	Piping

Marine Select List (Codelist) Disciplines

The following table lists the sheets in the **AllShipCodeLists.xls** workbook and their associated disciplines.

Sheet	Discipline
Aspect Code	All
Axial Profile Category	Molded Forms
Bracket Category	Structural Detailing
Check Piping Mfg Priority	Check Manufacturability
Check Piping Priority	Check Manufacturability
Check Planning Priority	Check Manufacturability
Collar Category	Structural Detailing
Deck Category	Molded Forms
Edge Reinforcement Category	Molded Forms
Flange Category	Molded Forms
IntelliShip Data Integrity Msgs	Molded Forms
IntelliShip Msgs	Molded Forms
Longitudinal Beam Category	Molded Forms
Longitudinal Bulkhead Category	Molded Forms
Longitudinal Profile Category	Molded Forms
Longitudinal Seam Category	Molded Forms
Longitudinal Tube Category	Molded Forms
Opening Category	Molded Forms
Part Class Types	All

Plate Part Category	Structural Detailing
Profile Part Category	Structural Detailing
Property Categories	Compartmentation, Planning, Structural Manufacturing
Ring Profile Category	Molded Forms
Shell Category	Molded Forms
Transverse Beam Category	Molded Forms
Transverse Bulkhead Category	Molded Forms
Transverse Profile Category	Molded Forms
Transverse Seam Category	Molded Forms
Transverse Tube Category	Molded Forms
Vertical Beam Category	Molded Forms
Vertical Profile Category	Molded Forms
Vertical Seam Category	Molded Forms
Vertical Tube Category	Molded Forms

See Also

Appendix: Select Lists (Codelists) (on page 679)

Select List (Codelist) Namespaces

Each select list belongs to a namespace. When you specify interfaces and attributes on the **Custom Interfaces** sheets in the reference data workbooks, you can specify a select list and namespace for the attribute.

The delivered select lists are in the following namespaces: CMNSCH (Common Schema), REFDAT (Reference Data), and UDP (User-Defined Package). When you define a select list, place it in the UDP namespace.

Select Lists in an Empty Catalog

Smart 3D creates these select lists (codelists) when you create an empty catalog using the AppRepos.dat database template. Among the listed select lists are the parent > child relationships for hierarchical select lists. In these cases, the parent select list are system select lists. The child select lists are user-defined select lists but they have no select list values in them. You need to define these values.

AlignComponent

AspectCode

AspectSelectionOptions

AssemblyInclusion

AutoBranchDataCreationOption

AutoIndCmdtyCdCreationOption

AutomatedFlangeSelectionOption

AuxiliaryTreatmentRequirement > AuxiliaryTreatment

BendToBendTangentBasis

BltCmdtyCodeExpnSubstOption

BoltDiameterEquivalenceOption

BoltExtensionOption

BoltingRequirements

BoltLengthCalculationOption

BoltLengthRoundOffOption

BoltLubricationRequirements

BoltOption

BoltType

BranchReportingOwnership

CableRouteStatus

CableTrayComponentClass > CableTrayComponentType

CableTrayMaterials

CableTrayPartDataBasis

CableTrayType

CableType

CapScrewLengthRoundOffOption

CatalogUnitsOfMeasureBasis

ClampOption

ClampSelectionBasis

CleaningRequirement

CleaningResponsibility

CmdtyCodeDependenceOnSchedule

CoatingColor

CoatingRequirement > CoatingType

CommodityCodeBuilderOption

ConduitSelectionBasis

ConnectionType

ConstructionRequirement > ConstructionType

ControlPointSubType

ControlPointType

CreateExclusiveWBSItem

CrossSectionCardinalPoints

CrossSectionEdges

CrossSectionShapeTypes

DesignResponsibility

DesignStandardPractice > DesignStandard

DistributionPortStatus

DistributionPortType

DoorsWindowsKinematics

DoorType

DrillingTemplatePattern

EccentricOffsetBasis

ElevPlaneType

EMI

EMI_Radiator

EMI_Suceptor

EndPractice > EndStandard

EnvironmentalZone

EquipmentComponentTypes1 > EquipmentComponentTypes2 > EquipmentComponentTypes3 >   EquipmentComponentTypes4

EquipmentTypes0 > EquipmentTypes1 > EquipmentTypes2 > EquipmentTypes3 > EquipmentTypes4 > EquipmentTypes5 > EquipmentTypes6

ExaminationPractice > Examination

ExteriorSurfaceTreatmentRequirement > ExteriorSurfaceTreatment

ExternalWeldedPipePart

FabricationRequirement > FabricationType

FabricationResponsibility

FabricationTypeBasis

FeatureType

FlangeFaceSurfaceFinish

FlangeFacing

FlangeInsulationKitType

FlipComponent

FlowDirection

FluidSystem > FluidCode

GasketCategory > GasketType

GasketInsideDiameterBasis

GasketManufacturerIndustryPractice > GasketManufacturer > GasketStyleNumber

GasketOption

GasketOutsideDiameterBasis

GasketRequirementOverride

GasketRequirements

GasketSelectionBasedOnFluidCode

GeometricIndustryPractice > GeometricIndustryStandard

GeometryType

GridPlaneType

GsktSlnForMismatchBltdEndsOpt

HandrailConnectionType

HandrailEndTreatment

HandrailInlineConnectionType

HandrailOffset

HandrailOrientation

HandrailSideConnectionType

HeaderBranchSizeBasisOption

HeatTracingRequirement > HeatTracingType > HeatTracingMedium

HngSupAssociatedPartType

HngSupAssociationType

HngSupBOMType

HngSupClassNodeType

HngSupCommand

HngSupConnectionInfoDiscipline > HngSupConnectionInfoType >
HngSupConnectionInfoName

HngSupConnectionType > HngSupConnectionProcess

HngSupConnectObj

HngSupCutType

HngSupDiscipline

HngSupEndTreatment

HngSupFaceSelectionType

HngSupJointType

HngSupManufacturer

HngSupMatingJointType

HngSupPartClassType

HngSupPortCategory

HngSupPortType

HngSupRuleType

HngSupStrictFaceSelection

HngSupTypeSelectionRule

HvacComponentTypes

HVACLiningRequirements > HVACLiningMaterial

HVACPartDataBasis

HVACPartGenerationBasis

HVACWidthAndDepthBasis

IgnoreBoundaries

IndustryCommodityCodeOption

InstallationResponsibility

InstrumentFunctionalClass > InstrumentFunctionalSubClass > InstrumentFunctionalType

InsulationMaterial

InsulationRequirement > InsulationType > InsulationPurpose

InsulationTemperatureBasis

InterferenceProcessingState

InterferenceRequiredAction

InterferenceType

InteriorSurfaceTreatmentRequirement > InteriorSurfaceTreatment

IsBendPlanar

JacketedClosureMethod

JacketedPipingBasis

LiningRequirements > LiningMaterial

LoadSpanClassificationPractice > LoadSpanClassification

LooseMaterialRequirements

MachBoltLengthRoundOffOption

ManufacturerIndustryPractice > Manufacturer

ManufacturingMethod

MapType

MaterialDescBuilderOption

MaterialsGradePractice > MaterialsCategory > MaterialsGrade

MaterialsGroup > MaterialsType

MaterialsOfConstructionClass

MemberOrientation

MethodsOfJacketPipeConstruction

MethodsOfTrimming

MinBendToBendTangentLenOption

MirrorBehaviorOption

MiscRequisitionComponentType > MiscRequisitionClassification

MultiportValveOpReq

NotePurpose

NutCreationOption

NutOption

NutType

OptionCategory > CommodityOption

OrificeFlangeTapOrientation

PaintingResponsibility

PartClassCategory > PartClassTypes

PartDataBasis

PartDataSource

PipeBendingMachineType

PipeBendRadiusByUserOption

PipeBendRadiusMultiplierOption

PipeBendType

PipeStockUsage

PipingCmdtyCtlgPartNoBasisOpt

PipingCmdtyProcurementDataOpt

PipingCommodityClass > PipingCommoditySubClass > PipingCommodityType

PipingCommodityOverrideOption

PipingPointUsage

PipingSpecificationNotesOpt

PipingSpecStatus

PipingSpecVerManagementOption

PlaneOfFlip

PropertyCategories

PurchaseLengthBasisOption

RatingPractice > PressureRating

RefPlaneViewDirections

ReportingRequirement > ReportingType

ReportingRequirementBasis

RequisitionResponsibility

RequisitionType

RespectAssemblyBoundaries

RevisionHistoryNotesOption

RingNumberPractice > RingNumber

RouteDirection

RouteLayout

RouteOnFace

ScheduleThicknessPractice > ScheduleThickness

SelectionBasis

ShortCodeHierarchyClass > ShortCodeHierarchyType

SignalType

SizeReductionPreference

SizeReductionType

SlabBoundaryReference

SlabComposition

SlabContinuity

SlabCornerType

SlabCrossSectionSymbol

SlabDirectionReference

SlabFacePosition

SlabFastenerType

SlabLayerRole

SlabManufacturingProcess

SlabNosingMaterial

SlabNosingType

SlabPriority

SlabReferenceDirection

SpoolBreakByControlPoint

SpoolIncludeWeldedParts

SpoolingBasis

SpoolSequencingType

SteamoutRequirement

StressReliefPractice > StressRelief

StressReliefRequirement

StructAlignment

StructBoundaryConditions

StructContinuity

StructCustomPlatePartCategory > StructCustomPlatePartType

StructEndReleases

StructFCEndControlling

StructFCSupportingCPs

StructFeatureRadiusType

StructFrmConnPositionRef

StructLoadCaseSourceCategory > StructLoadCaseSourceType

StructMemberEndSelectionRule

StructMemberPositionRule

StructuralMemberPriority

StructuralMemberTypeCategory > StructuralMemberType

StructuralWPOIntersectionIndex

SupplementaryNutRequirement

SupplementaryWasherRequirement

SupplyResponsibility

SupportsDiscipline > SupportsType

SurfacePreparation

TerminationClass > TerminationSubClass > EndPreparation

TestingRequirements > TestingType

TestingResponsibility

Tightness

Type

UndefinedServiceLimitsruleOpt

ValveManufacturerIndPractice > ValveManufacturer > ValveModelNumber

ValveOperatorClass > ValveOperatorType

ValveOperatorGeometricIndPract > ValveOperatorGeometricIndStd

ValveOperatorIsRotatable

ValveTrimPractice > ValveTrim

Vendor

VoltageGrade

WasherCreationOption

WasherOption

WasherType

WBSAutoGroupingRuleType

WBSItemAssignment

WBSItemType > WBSItemPurpose

WBSProjectPurpose

WBSProjectStatus

WBSPullInAssociatedItems

WeldClass > WeldType

WeldingRequirement

Align Component

The **Align Component** select list (codelist) specifies that an object is flat and whether it is on the bottom left, the top right, or in the center.

This select list is used in the Catalog task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Anvil_Constant_Dir

Anvil_Constant_Dir lists the options for travel direction (up or down). This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Constant_Dir**.

Anvil_Constant_Sus

Anvil_Constant_Sus lists the options for suspension. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Constant_Sus**.

Anvil_Dyn_Config

Anvil_Dyn_Config lists the options for configuration. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_Config**.

Anvil_Dyn_Finish

Anvil_Dyn_Finish lists the options for finish. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_Finish**.

Anvil_Dyn_PipeDia

Anvil_Dyn_PipeDia is not used. This select list (codelist) is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

Anvil_Dyn_ResOrient

Anvil_Dyn_ResOrient lists the options for reservoir orientation. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_ResOrient**.

Anvil_Dyn_ResType

Anvil_Dyn_ResType lists the options for reservoir type. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_ResType**.

Anvil_Dyn_Stroke

Anvil_Dyn_Stroke lists the options for stroke. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_Stroke**.

Anvil_Dyn_ValveType

Anvil_Dyn_ValveType lists the options for valve types. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Dyn_ValveType**.

Anvil_Dyn2_PipeDia

Anvil_Dyn2_PipeDia is not used. This select list (codelist) is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

Anvil_FIG137_Nuts

Anvil_FIG137_Nuts lists the options for the number of nuts. This select list (codelist) is used in the FIG137 part class in the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

♀TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG137_Nuts**.

Anvil_FIG167_Insulat

Anvil_FIG167_Insulat lists the options for insulation thickness. This select list (codelist) is used in the FIG167 part class in the Hangers and Support task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

♀TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG167_Insulat**.

Anvil_FIG218_FlangeW

Anvil_FIG218_FlangeW lists the options for beam flange width. This select list (codelist) is used in the FIG218 part class in the Hangers and Support task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

♀TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG218_FlangeW**.

Anvil_FIG255_Insulat

Anvil_FIG255_Insulat lists the options for insulation thickness. This select list (codelist) is used in the FIG255 part class in the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

♀TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG255_Insulat**.

Anvil_FIG292_FlangeW

Anvil_FIG292_FlangeW lists the options for beam flange width. This select list (codelist) is used in the FIG292 part class in the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

♀TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG292_FlangeW**.

Anvil_FIG299_Config

Anvil_FIG299_Config lists the options for configuration. This select list (codelist) is used in the FIG299 part class in the Hangers and Supports class. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG299_Config**.

Anvil_FIG86_Finish

Anvil_FIG86_Finish lists the options for finish. This select list (codelist) is used in the FIG86 part class in the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_FIG89_Finish**.

Anvil_Finish

Anvil_Finish lists the options for finish. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Finish**.

Anvil_Rod_Finish

Anvil_Rod_Finish lists the options for rod finish. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Rod_Finish**.

Anvil_Shoe_Base

Anvil_Shoe_Base lists the options for base connection types. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Shoe_Base**.

Anvil_Shoe_Finish

Anvil_Shoe_Finish lists the options for shoe finishes. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Shoe_Finish**.

Anvil_Shoe_Type

Anvil_Shoe_Type lists the options for base types. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Shoe_Type**.

Anvil_Stanchion_Dia

Anvil_Stanchion_Dia lists the options for stanchion pipe size. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Stanchion_Dia**.

Anvil_Strut_Finish

Anvil_Strut_Finish lists the options for strut finishes. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Strut_Finish**.

Anvil_Variable_ColType

Anvil_Variable_ColType lists the options for column type. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Variable_ColType**.

Anvil_Variable_Dir

Anvil_Variable_Dir lists the options for travel direction (up or down). This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Variable_Dir**.

Anvil_Variable_RollMat

Anvil_Variable_RollMat lists the options for pipe roll material. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_Variable_RollMat**.

Anvil_Variable_Top

Anvil_Variable_Top lists the options for the top piece. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

Anvil_WithWithout

Anvil_WithWithout lists the options for whether or not to have a certain part, such as a retaining clip. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_WithWithout**.

Anvil_YesNo

Anvil_YesNo lists the options for whether or not to designate the part for copper tubing. This select list (codelist) is used in the FIG167 part class in the Hangers and Support task. This select list is delivered in HS_Anvil_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Anvil_YesNo**.

ApprovalReason

ApprovalReason lists the options for the **Status** box on the **Configuration** tab of the **Properties** dialog box. You can customize the codelist table to suit your needs by adding possible states under the parent category (Working, InReview, Rejected and Approved).

Codelist items highlighted in yellow in the following table are defaults for the corresponding parent item.

You can create and delete codelist items other than the defaults to meet your needs. You can only customize the long values of the default codelist values.

The ApprovalReason.xls spreadsheet is delivered by default to the *[Product Folder]*\CatalogData\BulkLoad\SampleDataFiles folder.

HEAD	ApprovalStatus ShortDescription	ApprovalStatus LongDescription	ApprovalReason ShortDescription	ApprovalReason LongDescription	Codelist Number	Sort Order
!	The numeric value for any new code list entry added by the user should be between 10,001 and 40,000. SmartPlar
START
	Approved	Approved			8	
			Approved-D	Approved-D	803	
			Approved-C	Approved-C	802	803
			Approved-B	Approved-B	801	802
			Approved	Approved	8	801
	Rejected	Rejected			4	
			Rejected-D	Rejected-D	403	8
			Rejected-C	Rejected-C	402	403
			Rejected-B	Rejected-B	401	402
			Rejected	Rejected	4	401
	InReview	InReview			2	
			InReview-D	InReview-D	204	4
			InReview-C	InReview-C	203	204
			InReview-B	InReview-B	201	203
			InReview	InReview	2	201
	Working	Working			1	
			Working-B	Working-B	102	2
			Working	Working	1	102
END

The default values are system defined codelist values and are not modifiable except for the long values. You can customize the list by adding new values and then bulkloading the file.

Aspect Code

Aspect Code defines the available aspect codes in the software. This select list is used in the reference data for multiple tasks. Aspects are associated parameters that represent additional information needed for placement of objects. Aspects can represent clearances for safety or maintenance, additional space required during operation, or simple and detailed representations of objects. You can define aspects for select list numbers 19 through 31. This list belongs to the CMNSCH namespace.

★ IMPORTANT

- Aspect select list numbers 1 through 3, and 8 through 18 are reserved for use by the software and should not be modified.

- Select list number 17 is for Molded Forms. Do not change this aspect code.

- Do not define an aspect code of 32 or greater.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **AspectCode**.

Aspect Selection Options

The **Aspect Selection Options** select list (codelist) defines the interference checking priority for aspects.

This select list is used in the interference checking process. The list belongs to the CMNSCH namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Assembly Inclusion

The **Assembly Inclusion** select list (codelist) specifies the options for designating how assemblies are handled during the creation of WBS items and assignment of parts. For example, if the query is locating pipe parts, the software checks to see if each part belongs to an assembly (spool), and if so, the assembly is added to the WBS item along with the part.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Assembly YesNoAuto

The **Assembly_YesNoAuto** determines if a turnbuckle needs to be added to the support. This select list (codelist) is used by the Load Based Rigid Rod assembly (Assy_RR_LR) in the HS_Assembly.xls workbook. The select list is used for the Hangers and Supports task with the following options:

- **Yes** - add the turnbuckle
- **No** - do not add the turnbuckle
- **Auto** - add the turnbuckle if the length of the rod is greater than a pre-defined length.

This select list is delivered in HS_Assembly_Codelist.xls and belongs to the UDP namespace.

Assembly_BBXAlignment

The **Assembly_BBXAlignment** select list specifies the different bounding box alignments that are available. This select list is in the HS_Assembly_Codelists.xls workbook and belongs to the UDP namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Assembly_RefPorts

The **Assembly_RefPorts** select list specifies whether the assembly should use the default reference port or the alternate reference port. This select list is in the HS_Assembly_Codelists.xls workbook and belongs to the UDP namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Assembly_Variable_Dir

Assembly_Variable_Dir lists the options for travel direction (up or down). This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Assembly_Codelist.xls and belongs to the UDP namespace.

♦ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Assembly_Variable_Dir**.

Assembly_WithWithout

Assembly_WithWithout lists the options for whether or not the assembly has certain parts, such as plates or a turnbuckle. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Assembly_Codelist.xls and belongs to the UDP namespace.

♦ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Assembly_WithWithout**.

Automated Branch Data Creation

Automated Branch Data Creation specifies the automated branch data creation logic. It allows you to enable or disable the creation of branch data.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Automated Flange Selection Option

The **Automated Flange Selection Option** select list (codelist) specifies the automated flange selection logic. The specification writer can distinguish between flanges inserted on plain piping versus flanges inserted in fitting-to-fitting situations. The option is typically enabled for a piping materials class that includes slip-on flanges or lap-joint flanges.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Automated Industry Commodity Code Creation Option

Automated Industry Commodity Code Creation Option allows the specification writer to enable or disable the creation of industry commodity codes.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Auxiliary Treatment

The **Auxiliary Treatment** select list (codelist) specifies exterior coating and surface treatments. As an example, an underground specification must be coated to prevent galvanic corrosion.

Here are some examples of when this select list is used:

- Managing process flow and communicating production information in a pipe shop during the manufacture of spools.
- Treating pipe with heat treatments, such as post-weld heat treatment.
- Manufacturing underground piping, which may need a coating for water protection and to prevent the creation of a galvanic cell.
- Exposing pipe to the environment in oil and gas processing plants and on offshore platforms.
- Coating FRP (Fiberglass Reinforced Plastic) piping systems after installation, regardless of environment.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Auxiliary Treatment Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

★ IMPORTANT When you add an entry to a select list, the number for the entry must be between 10,000 - 40,000. Numeric values less than 10,000 and greater than 40,000 are reserved for use by the software.

Axial Profile Category

The **Axial Profile Category** select list (codelist) defines the available axial profile categories in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Bend To Bend Tangent Basis

The **Bend To Bend Tangent Basis** select list (codelist) specifies the basis for measuring the minimum tangent length between bend dimensions. This property determines how the minimum bend-to-bend tangent lengths from the pipe bending die data and the minimum bend-to-bend tangent length data are interpreted.

In some cases, the data for minimum bending lengths is specified as the interior tangent lengths, (in other words, the tangents between two turns, from tangent point to tangent point). In other cases, the data is specified as the length from turn point to turn point.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Commodity Code Expansion Substitute Option

Bolt Commodity Code Expansion Substitute Option defines the available options for bolt commodity code changes and how the bolt commodity code is affected. This codelist is used in the catalog task. This list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Diameter Equivalence Option

The **Bolt Diameter Equivalence Option** select list (codelist) defines the options for using the Bolt Diameter Equivalence Rule for reporting the bolt diameter. This optional rule enables the specification writer to define a correlation between the values of bolt diameter in the primary system of units for bolt diameter and the values of bolt diameter in the secondary system of units.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Extension Option

The **Bolt Extension Option** select list (codelist) defines the available bolt extension options. The bolt extension values determine the length of the exposed threads for the bolt length calculation for both studs and machine bolts from the bolted end generic data. The bolt extension also includes any additional length required for stud tensioners. The nut height and the washer thickness, if applicable, are addressed independently of the bolt extension.

The specification writer can define a standard bolt extension and as many as five alternate bolt extension values.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Length Calculation Option

The **Bolt Length Calculation Option** select list (codelist) enables you to specify whether the software calculates bolt lengths. Refer to the Default Project Options topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Length Round Off Option

The **Bolt Length Round Off Option** select list (codelist) defines the options for how you want the software to handle bolt lengths. Refer to the Default Project Options topic in the *Piping Reference Data Guide* for more information on how this select list is used.

- If you choose **None** (number 5), the software uses the computed bolt length.

- If you choose **Use Value** (number 10), the software rounds the computed bolt length up to the next increment of that round off value.

- If you choose **Use list of preferred bolt lengths** (number 15), the software rounds the computed bolt length up to the smallest preferred bolt length that exceeds the computed bolt length.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Lubrication Requirements

The **Bolt Lubrication Requirements** select list (codelist) defines the different bolt lubrications that you want to make available in the model. Refer to the Bolt Part Data topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Bolt Option

The **Bolt Option** select list (codelist) specifies the optional bolt selections enabled by the specification writer.

A default bolt option represents the bolt to be used when the piping designer has not explicitly selected one. The bolt option, if applicable, is selected by the piping designer at a bolted joint.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Bolt Requisition Classification

The **Bolt Requisition Classification** select list (codelist) allows greater integration with materials management.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolt Thread Designation

The **Bolt Thread Designation** select list (codelist) allows you to define specific bolt thread standards.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING This is a hierarchical select list. In the Parent select list (Bolt Thread Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Bolt Type

The **Bolt Type** select list (codelist) defines all available bolt types.

The quantity of nuts and washers is determined on the basis of the bolt type. For machine bolts, a nut and a washer is required for each bolt. Optionally, you can specify that one supplementary nut is required for a machine bolt.

For studs, a nut and a washer are required for each end of the stud. In other words, a stud requires two nuts and two washers. Optionally, one supplementary nut may be required for each end of a stud.

For cap screws, only a washer is required for each screw.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolting Requirements

The **Bolting Requirements** select list (codelist) defines bolting requirements, such as bolt reporting and cap screw substitution.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Bolting Requirements (Optional)

Select the bolting requirement for the piping commodity. The following options are available:

- **Undefined** - The bolting requirement is undefined.

- **Bolting required** - The piping commodity requires a reportable set of bolts determined by the bolted joint, but based on a special bolt extension option. If you select this option, you must define the **Bolt Extension Option**.

- **Complete substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of threaded holes to match the drilling template applicable to the mating flange.

- **Complete substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of the bolted joint. Cap screws (or tap end stud bolts) are used for all bolt holes in this situation and represent a complete substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option when the through-bolted fitting includes a complete set of tapped holes to match the drilling template applicable to the mating flange.

- **Partial substitution with cap screws for threaded holes** - The piping commodity requires a reportable set of substitution cap screws for threaded holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of threaded holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are threaded.

- **Partial substitution with cap screws for tapped holes** - The piping commodity requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself instead of some of the bolts determined by the bolted joint. This option represents a partial substitution of the bolts that would have otherwise been determined by the bolted joint. Use this option to address the situation where the through-bolted fitting includes a partial set of tapped holes with respect to the drilling template applicable to the mating flange, and also the situation where the through-bolted fitting includes a complete set of holes to match the drilling template applicable to the mating flange, but only some of the holes are tapped.

- **Bolts supplied with nozzle and not to be reported** - The piping commodity is supplied with the necessary bolts included, such that the applicable bolts should not be reported.

- **Reportable bolts not required** - A set of bolts is not applicable to any end of this piping commodity because all ends are non-bolted. This option is the default for any piping commodity without any bolted ends.

- **Complete substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of threaded holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Complete substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by the fitting itself, for example a reducing flange, instead of the bolted joint. Cap screws are used for all bolt holes in this situation. This represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a complete set of tapped holes to match the drilling template applicable to the companion flange. This option is not available for nozzles.

- **Partial substitution with cap screws for full threaded holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws for full threaded holes determined by the fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This option represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the smaller end of a reducing flange includes a partial set of threaded holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of the reducing flange includes a complete set of

holes to match the drilling template applicable to the companion flange, but only some of the holes are threaded. This option is not available for nozzles.

- **Partial substitution with cap screws for tapped holes at second size end, where the cap screws only apply at the second size end** - The second size end requires a reportable set of substitution cap screws (or substitution tap end stud bolts) for tapped holes determined by fitting itself, for example a reducing flange, instead of some of the bolts determined by the bolted joint. This represents a partial bolt substitution that would have otherwise been determined by the bolted joint. This will address the situation where the smaller end of a reducing flange includes a partial set of tapped holes with respect to the drilling template applicable to the companion flange, and also the situation where the smaller end of a reducing flange includes a complete set of holes to match the drilling template applicable to the companion flange, but only some of the holes are tapped. This option is not available for nozzles.

- **Complete cap screw substitution for full threaded and tapped holes for each bolted end** - Each bolted end requires a reportable set of substitution cap screws for full threaded holes and also tapped holes determined by the fitting itself instead of the bolted joint. Cap screws are used for all bolt holes in this situation. In other words, this represents a complete bolt substitution that would have otherwise been determined by the bolted joint. This option addresses the situation where the through-bolted fitting includes a complete set of threaded holes and also tapped holes to match the drilling template applicable to the companion flange. This can be required, as an example, for a larger size asymmetrical lug body butterfly valve where tapped holes are required near the valve stem. This option is not available for nozzles.

NOTES

- Any through-bolted joint, where the Termination Subclass for one of the bolted ends indicates through-bolted end with bolt holes, but the Bolting Requirement property for the fitting at that same bolted end indicates a complete substitution of cap screws (or tap end stud bolts), the software considers it to be a bolted joint, not a through-bolted joint.

Although two or more through-bolted fittings may be involved in forming a through-bolted connection, the software assumes that only one through-bolted fitting exists for any situation where either complete substitution or partial substitution with cap screws (or tap end stud bolts) applies. Furthermore, whenever two or more through-bolted fittings form a through-bolted connection, the software assumes that the bolts extend through all of the through-bolted fittings.

Bracket Category

The **Bracket Category** select list (codelist) defines the available bracket categories in the software.

This select list is used in the Structural Detailing task. The list belongs to the UDP namespace.

Branch Reporting Ownership

The **Branch Reporting Ownership** select list (codelist) defines the options for reporting on branch components.

If, during reporting, you want the software to report the branch component with the rest of the branch, you must select **Branch owns branch component** (number 5).

However, if, during reporting, you want the software to report the branch component with the header that it connects to, you must select **Header owns branch component** (number 10).

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

bsWeldType

The **bsWeldType** select list (codelist) specifies whether the weld is a fillet weld or a bevel-fillet weld. This select list is in the HS_S3DParts_Codelists.xls workbook and belongs to the UDP namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

bsWeldSide

The **bsWeldSide** select list (codelist) specifies whether the weld is placed on both sides or just the side indicated by the arrow. This select list is in the HS_S3DParts_Codelists.xls workbook and belongs to the UDP namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cable Route Status

The **Cable Route Status** select list (codelist) defines the available options for cable routing status. The software uses the status for reporting on cable.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cable Tray Component Type

The **Cable Tray Component Type** select list (codelist) defines all the cable tray component types that you want to select from in the model.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (CableTray Component Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Cable Tray Materials

The **Cable Tray Materials** select list (codelist) defines all cable tray materials that you want to select from in the model.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

Cable Tray Part Data Basis

The **Cable Tray Part Data Basis** select list (codelist) specifies the values for the basis of the dimensional data for cable tray parts. The purpose of this property is to recognize those components that require special treatment when interpreting the dimensional data.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cable Tray Type

The **Cable Tray Type** select list (codelist) defines all the cable tray types available to route in the model.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

Cable Type

The **Cable Type** select list (codelist) defines the applicable values for the cable type property, which is used when assigning values to cable runs for tray fill calculations.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cap Screw Length Round Off Option

The **Cap Screw Length Round Off Option** select list (codelist) specifies the available methods for bolt length round off in the cap screw length calculations.

After the bolt length has been computed, the length of the cap screw must be rounded to a practical value.

The specification writer can choose to specify a simple round off, or no round off; or can choose to define the algorithm to round off the cap screw length on the basis of a list of the available purchased, or preferred, cap screw lengths, as a function of the cap screw diameter, and optionally, the materials grade of the cap screw.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Catalog Units of Measure Basis

The **Catalog Units of Measure Basis** select list (codelist) defines the method of querying the piping catalog for units of measure. Refer to the Piping Commodity Filter topic in the Pip*ing Reference Data Guide fo*r more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Check Piping Mfg Priority

Check Piping Mfg Priority defines the available piping manufacturing priorities in the software. The priorities are used in the check manufacturability process.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CheckPipingMfgPriority**.

Check Piping Priority

The **Check Piping Priority** select list (codelist) defines the piping priorities.

This select list is not currently used in the software. The list belongs to the UDP namespace.

Check Planning Priority

Check Planning Priority defines the available planning priorities in the software. The priorities are used in the check manufacturability process.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CheckPlanningPriority**.

Clamp Option

The **Clamp Option** select list (codelist) specifies the list of available clamp selections enabled by the specification writer.

A default clamp option represents the clamp that should be used when the piping designer has not explicitly selected one. The clamp option, if applicable, is selected by the piping designer at a bolted joint.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Clamp Requirement

The **Clamp Requirement** select list (codelist) specifies whether a reportable clamp is required or not.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Clamp Selection Basis

The **Clamp Selection Basis** select list (codelist) defines the choices for clamp service limits validation.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cleaning Requirement

The **Cleaning Requirement** select list (codelist) defines all the possible cleaning requirements that you can choose from in the model.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

Cleaning Responsibility

The **Cleaning Responsibility** select list (codelist) defines all the parties available for cleaning responsibility.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Coating Color

The **Coating Color** select list (codelist) defines the available colors for a coating.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Coating Type

The **Coating Type** select list (codelist) defines all coating requirements and types available in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

❶ WARNING This is a hierarchical select list. In the Parent select list (Coating Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Collar Category

The **Collar Category** select list (codelist) defines the available categories for collars in the software.

This select list is used in the Structural Detailing task. The list belongs to the UDP namespace.

Commodity Code Builder Option

The **Commodity Code Builder Option** select list (codelist) defines options to designate whether the software provides assistance in selecting commodity codes when the specification writer creates or revises commodity code properties in piping specifications or the piping catalog. If this option has been enabled, the software provides the specification writer with the Commodity Code Builder.

This list also includes the option for automated creation of the industry commodity code in the piping commodity class data on the basis of property values and customizable formats.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Commodity Option

The **Commodity Option** select list (codelist) defines the list of commodity selections available to the piping specification writer for a default commodity option. A default commodity option represents the piping commodity that the software uses when the piping designer has not explicitly selected a piping commodity. The default commodity option is also used when selecting a branch fitting, as a consequence of using the Branch Intersection rule. The commodity option is ignored in the automated selection of flanges.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNINGS

- This is a hierarchical select list. In the Parent select list (Option Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

- Do not edit the **Default** record in this sheet.

The following examples show how to use commodity options:

- Selecting a specific type of piping commodity for a generic short code. For example, selecting a pipe bend, when the default change-of-direction fitting is an elbow, or selecting a gate valve, when the default vent/drain valve is a ball valve.

- Selecting an optional nipple length for a branch nipple.

- Selecting an optional angular offset for a tapered spacer.

- Selecting an optional rating, for example, a 300# valve in a 150# piping materials class.

- Selecting an optional fitting for a different version of an industry standard or manufacturer catalog.

- Selecting an optional valve type for a specific valve.

- Selecting an optional valve operator type for a specific valve.

- Selecting an optional bend radius for an elbow or a pipe bend.

- Selecting a different number of miter cuts for a mitered elbow.

- Selecting an optional fitting with different end conditions than the default.

- Selecting an optional fitting with a different schedule (or thickness) than the default.

- Selecting an optional fitting with a different design code than the default.

- Selecting an optional fitting with a different manufacturer than the default.

- Selecting an optional choice for plain piping or tubing.

Compart Coating Color

Compart Coating Color defines the available coating colors for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartCoatingColor**.

Compart Coating Process

Compart Coating Process specifies the different coating processes for compartments. This select lists (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartCoatingProcess**.

Compart Coating Responsibility

Compart Coating Responsibility defines the list of responsible parties available for applying the coating to compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartCoatingResponsibility**.

Compart Coating Status

Compart Coating Status lists the different statuses for compartment coatings. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartCoatingStatus**.

Compart Coating Type

Compart Coating Type lists the types of coatings that you want to use for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartCoatingType**.

Compartment Authorization Class

Compartment Authorization Class specifies the levels of authorization for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentAuthorizationClass**.

Compartment Bulk Cargo Type

Compartment Bulk Cargo Type specifies the different types of bulk cargo for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentBulkCargoType**.

Compartment Bulkhead Tightness

Compartment Bulkhead Tightness specifies the levels of bulkhead tightness for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentBulkheadTightness**.

Compartment Capacity Context

Compartment Capacity Context specifies the levels of capacity for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCapacityContext**.

Compartment Cargo Context

Compartment Cargo Context specifies the levels of cargo context for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCargoContext**.

Compartment Coating Applicability

Compartment Coating Applicability specifies the coating applicability options for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCoatingApplicability**.

Compartment Coating Certification

Compartment Coating Certification specifies the levels of coating certification for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCoatingCertification**.

Compartment Coating Inspection

Compartment Coating Inspection specifies the coating inspection options for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCoatingInspection**.

Compartment Compartment Group

Compartment Compartment Group specifies the groups for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCompartmentGroup**.

Compartment Compartment Type

Compartment Compartment Type specifies the different types for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

♀ TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentCompartmentType**.

Compartment Contact Material Type

Compartment Contact Material Type specifies the types of contact materials for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentContactMaterialType**.

Compartment Damage Location

Compartment Damage Location specifies the damage locations for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentDamageLocation**.

Compartment Damage Type

Compartment Damage Type specifies the types of damage for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentDamageType**.

Compartment Design Requirement

Compartment Design Requirement specifies the design requirement options for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentDesignRequirement**.

Compartment Function Type

Compartment Function Type specifies the types of functions for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentFunctionType**.

Compartment Insulation Category

Compartment Insulation Category specifies the categories of insulation for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentInsulationCategory**.

Compartment Naval Nuclear Class

Compartment Naval Nuclear Class specifies the naval nuclear classes for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentNavalNuclearClass**.

Compartment Naval Safety Category

Compartment Naval Safety Category specifies the categories of naval safety for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentNavalSafetyCategory**.

Compartment Naval Security Class

Compartment Naval Security Class specifies the classes of naval security for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentNavalSecurityClass**.

Compartment Noise Category

Compartment Noise Category specifies the categories of noise levels for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentNoiseCategory**.

Compartment Positional Rel Type

Compartment Positional Rel Type specifies the types of positional relationships for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentPositionalRelType**.

Compartment Property Context

Compartment Property Context specifies the property context options for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentPropertyContext**.

Compartment Relevant Cargos

Compartment Relevant Cargos specifies the relevant types of cargo for compartments. This codelist is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentRelevantCargor**.

Compartment Structure Type

Compartment Structure Type specifies the types of structure for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentStructureType**.

Compartment Surface Preparation

Compartment Surface Preparation specifies the different types of surface preparation for compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **CompartmentSurfacePreparation**.

Conduit Selection Basis

The **Conduit Selection Basis** select list (codelist) defines the conduits available for use in the model.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Connection Type

The **Connection Type** select list (codelist) defines the types of connections available in the software.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Construction Type

The **Construction Type** select list (codelist) defines the list of construction types available for use in the model.

Construction type is the same as construction status in PDS. The construction type property is used in rules in the specification, but its value is specified in the model.

This select list is used in multiple tasks and is also used in an integrated environment. The list belongs to the CMNSCH namespace.

⚠ **WARNING** This is a hierarchical select list. In the Parent select list (Construction Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Control Point Subtype

The **Control Point Subtype** select list (codelist) defines subtypes, or disciplines, for the control points.

This select list is used in the Common task. The list belongs to the CMNSCH namespace.

⚠ **CAUTION**

- Numbers 1 through 6, and 10 through 19 are reserved for use by the software and should not be modified.

- You can define numbers 20 through 31.

Control Point Type

The **Control Point Type** select list (codelist) defines the different control points that you can place or edit in the model.

This select list is used in the Common task. The list belongs to the CMNSCH namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Create Exclusive WBS Item

The **Create Exclusive WBS Item** select list (codelist) is a Boolean (Yes/No) list that specifies whether or not a WBS item is exclusive.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cross Section Cardinal Points

The **Cross Section Cardinal Points** select list (codelist) defines the cardinal points for members in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cross Section Edges

The **Cross Section Edges** select list (codelist) defines the edges for cross sections of members in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⦿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Cross Section Shape Types

The **Cross Section Shape Types** select list (codelist) defines the available duct cross section shapes.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⦿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Deck Category

The **Deck Category** select list (codelist) defines the available deck categories in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Design Responsibility

The **Design Responsibility** select list (codelist) defines the list of parties available for the design responsibility of an object.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Design Standard

The **Design Standard** select list (codelist) defines the available design standards.

This select list is used in multiple tasks. For example, in the Piping task, the list is used in calculating piping wall thickness and branch reinforcements. The list belongs to the CMNSCH namespace.

⦿ WARNING This is a hierarchical select list. In the Parent select list (Design Standard Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Distributed Port Status

Distributed Port Type

Door Frame Position

The **Door Frame Position** select list (codelist) specifies the values that represent the door frame position within the specified support.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Door Type

The **Door Type** select list (codelist) specifies the different types of doors available in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Doors Windows Kinematics

The **Doors Windows Kinematics** select list (codelist) specifies the values that represent the motion of doors and windows.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

DrawingIssueReason

The **DrawingIssueReason** select list (codelist) defines the list of reasons a drawing can be issued. This select list is used in the Drawings and Reports task. This list belongs to the UDP namespace.

Drawing Style Codelist

The **Drawing Style** select list (codelist) defines the list of drawing types available for use in drawings.

This select list is used in the Drawings and Reports task. This list belongs to the UDP namespace.

Drilling Template Pattern

The **Drilling Template Pattern** select list (codelist) specifies the values that represent the arrangement of bolt holes at a bolted end. For pictures of common drilling patterns, see Bolt Hole Patterns.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Eccentric Offset Basis

The **Eccentric Offset Basis** select list (codelist) specifies the values for the basis on which the eccentric offset is computed for an eccentric reducer. The eccentric reducer symbol uses this property to determine whether the eccentric offset is based on the inside diameter or the outside diameter.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Edge Reinforcement Category

The **Edge Reinforcement Category** select list (codelist) defines the available categories for edge reinforcements in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

EFW Correlation Approval Status

The **EFW Correlation Approval Status** select list (codelist) defines property and topology inconsistencies between correlated objects.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

EFW Correlation Basis

The **Engineering Frame Work Correlation Basis** select list (codelist) defines the property values for whether or not an EFW object is correlated or not. This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

EFW Correlation Status

The **Engineering Frame Work Correlation Status** select list (codelist) defines the properties for different levels of correlation of piping objects. This select list is used in the piping task. The list belongs to the CMNSCH namespace.

Elevation Plane Type

The **Elevation Plane Type** select list (codelist) defines the elevation planes that you want to place in the model.

This select list is used in the Grids task. The list is delivered in GridsCodelist.xls and belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

EMI

The **EMI** select list (codelist) defines the available electromagnetic interference types.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

EMI Radiator

The **EMI Radiator** select list (codelist) defines the available electromagnetic radiator values.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

EMI Suceptor

The **EMI Suceptor** select list (codelist) defines the available electromagnetic suceptor values.

This codelist is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

End Preparation

The **End Preparation** select list (codelist) defines all end preparations available for modeling.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select lists (Termination Class and Termination SubClass), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

End Standard

The **End Standard** select list (codelist) defines the list of end standards available for modeling.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (End Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Property Page Behavior

When you view this select list on **Properties** dialog boxes, the software only displays the practices that have child values. For example, only the parent End Practices with child values (End Standards) display.

Upon migration, if a parent has been previously selected (and this parent has no children), the software shows the following behavior. The first time you display the **Properties** dialog box and click the parent field, that parent value is discarded. The software does not allow you to re-select this parent, unless child values are added in the catalog.

Environmental Zone

The **Environmental Zone** select list (codelist) defines the list of environmental zones for which outside coating type, outside surface treatment, and auxiliary treatment of piping and fittings apply.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

Equipment Component Types

The **Equipment Component Types** select list (codelist) defines the available types of equipment for use when designing equipment.

This select list is used in the Equipment and Furnishings task. The list belongs to the CMNSCH namespace.

⊕ WARNING Some of the values in this select list should not be changed.

Equipment Symbol Errors

The **Equipment Symbol Errors** select list (codelist) defines the Equipment .NET symbol errors.

This select list is used in Equipment. The list belongs to the UDP namespace.

Equipment Types

The **Equipment Types** select list (codelist) defines the available types of equipment for use in the model.

This select list is used in the Equipment and Furnishings task. The list belongs to the CMNSCH namespace.

⊕ WARNING Some of the values in this select list should not be changed.

Examination

The **Examination** select list (codelist) specifies the values representing the industry practices for examination, inspection, and testing. Refer to the Piping Materials Class Data topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⊕ WARNING This is a hierarchical select list. In the Parent select list (Examination Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Exterior Surface Treatment

The **Exterior Surface Treatment** select list (codelist) defines the list of available exterior surface treatments in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Exterior Surface Treatment Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

External Welded Pipe Part

The **External Welded Pipe Part** select list (codelist) defines the list of available external welded pipe parts in the model.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Fabrication Responsibility

The **Fabrication Responsibility** select list (codelist) defines the parties that are responsible for fabricating objects.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Fabrication Type

The **Fabrication Type** select list (codelist) defines the different fabrication requirements for objects in the model. In many cases, fabrication requirements and type can vary from project to project.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Fabrication Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Fabrication Type Basis

The **Fabrication Type Basis** select list (codelist) defines the available fabrication types in the software.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Feature Type

The **Feature Type** select list (codelist) specifies the feature types that determine boundaries during fitting placement.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Flange Category

The **Flange Category** select list (codelist) defines the available categories for flanges in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Flange Face Surface Finish

The **Flange Face Surface Finish** select list (codelist) specifies the surface finishes for the flange faces of piping commodities. Surface finish is a measure of the smoothness of a flange face.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Flange Facing

The **Flange Facing** select list (codelist) specifies the different flange facing values for gaskets.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Flange Insulation Kit Type

The **Flange Insulation Kit Type** select list (codelist) specifies the values that represent the type of flange insulation kit. This value is only required when the gasket represents a flange insulation kit.

The Flange Insulation Kit Type value is used to determine the additional bolt length required due to the insulating washer(s) and the metallic electro-plated washer(s).

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Flexible Hose Topology Type

The Flexible Hose Topology Type select list (codelist) specifies the topology options for flexible hose. Options include Radial, Offset and Travelling loop placement.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Flip Component

The **Flip Component** select list (codelist) specifies whether an object is on the bottom left or on the top right.

This select list is used in the Catalog task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Flow Direction

The **Flow Direction** select list (codelist) defines the available flow directions for runs in the model. Flow direction is used in the model when users place flow-directional components, such as check valves.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.
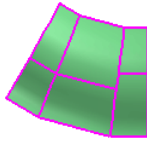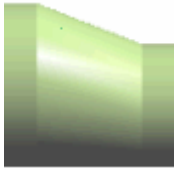
⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Fluid Code

The **Fluid Code** select list (codelist) defines the fluid systems and fluid codes available for use in the model.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Fluid System), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Front End Type

The **Front End Type** select list (codelist) specifies the front end types for heat exchanger equipment.

This select list is used in the Equipment task. The list belongs to the UDP namespace.

Gasket Inside Diameter Basis

The **Gasket Inside Diameter Basis** select list (codelist) represents the basis values for computing the inside diameter of gaskets. Refer to the Gasket Part Data topic in the Piping Refere*nce Data Guide for more inf*ormation on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Option

The **Gasket Option** select list (codelist) defines the gaskets available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Gasket Outside Diameter Basis

The **Gasket Outside Diameter Basis** select list (codelist) represents the basis values for computing the outside diameter of gaskets. Refer to the Gasket Part Data topic in the Piping Re*ference Data Guide for more* information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Requirement Override

The **Gasket Requirement Override** select list (codelist) provides options that enable the specification writer to define whether gaskets are required for lined, flanged fittings. In effect, this property represents an override of the Gasket Requirement property in the Catalog.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Requirements

The **Gasket Requirements** select list (codelist) defines the list of gasket requirements available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Selection Based on Fluid Code

The **Gasket Selection Based on Fluid Code** select list (codelist) specifies the options for gasket selection based on fluid code.

This list is intended to address a situation where a piping spec is applicable to 15-20 different values of fluid code. Most of the fluid code values applicable to this piping spec use the default gasket. However, a few fluid code values require special gaskets. The intent of this select list is to avoid the situation where the spec writer must create gasket records for each fluid code.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Selection for Mismatched Bolted Ends Option

The **Gasket Selection for Mismatched Bolted Ends Option** select list (codelist) specifies the options for gasket selection based on bolted ends.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Gasket Style Number

The **Gasket Style Number** select list (codelist) specifies the gasket manufacturers and gasket style numbers.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING This is a hierarchical select list. In the Parent select lists (Gasket Manufacturer Industry Practice and Gasket Manufacturer Industry Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

Gasket Type

The **Gasket Type** select list (codelist) defines the gasket categories and types available for use in the model. Refer to the Gasket Part Data topic in the Piping *Reference Data Guide for mo*re information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING This is a hierarchical select list. In the Parent select list (Gasket Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Geometric Industry Standard

The **Geometric Industry Standard** select list (codelist) defines the source, normally either an industry standard or a manufacturer, used in the preparation of the catalog data applicable to the piping commodity.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

① WARNING This is a hierarchical select list. In the Parent select list (Geometric Industry Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Two cases for geometric industry standards exist:

- The piping commodity is of a type, size, or function such that its dimensions are governed by an industry standard. Many fittings and certain sizes of some valves fall into this category. In this case, the geometric industry standard specifies the governing standard.

- The piping commodity is of a type, size, or function such that its dimensions are manufacturer-specific, and, therefore, are not controlled by any industry standard. Many smaller-sized fittings and valves fall into this category. This situation has two additional possibilities.

  - Precise dimensions are not critical. A company-specific engineering standard may be created for the piping commodity type that enables a standard catalog definition in order to permit modeling in those situations where the precise dimensions of the piping commodity are not critical. This situation is practical when the piping system in question

is field-routed and fabricated. It is not practical in situations where space tolerances are extremely critical, or when the piping is to be shop-fabricated. In these cases, the geometric industry standard must reflect the engineering standard.

- Precise dimensions are critical. In this case, the geometric industry standard must eventually reflect the manufacturer of the piping commodity.

▤ NOTE

- The geometric industry standard distinguishes between versions of an industry standard or manufacturer data. In other words, version 'a' of a specific industry standard is different from version 'b' of the same industry standard by two distinct values of the geometric industry standard. When a model is revamped, it is possible that the dimensional data for some fittings will have changed between the existing, or as-built, data and the most recent dimensional data. In some situations, it will be necessary for the piping designer to model an older version of a fitting in the same model, where the newer version of the fitting is modeled.
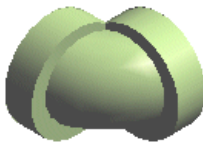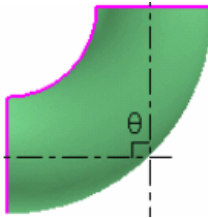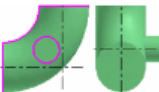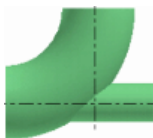
Geometry Type
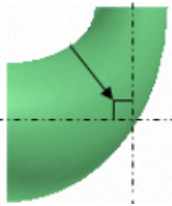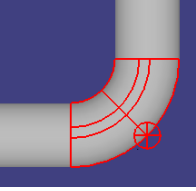
The **Geometry Type** select list (codelist) defines the geometric characteristics and the topology of the piping ports for piping parts. You must specify the correct geometry type so that the software knows how to handle the item when placing it in the model.

This select list is used in the reference data for the Piping task when defining piping instruments and specialty item parts. The list belongs to the REFDAT namespace. You can use this list to map the Component Geometry to Route Feature Type.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
5	Variable length pipe stock or tubing	Plain piping or tubing variable length	SF		This value applies to pipe stock or tubing, where the length is not constrained by a purchase length.	
10	Fixed length pipe stock or tubing	Plain piping or tubing fixed length	SF		This value applies to pipe stock or tubing, where the length is constrained by a purchase length.	
11	Variable length integral core and jacket piping	Integral core and jacket piping Variable length	ALF_COMP ONENT		This value applies to pipe stock, which represents a jacket integral with the core, where the length is not constrained by a purchase length.	Can be placed in a straight or on an end port.
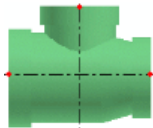
Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
15	Linear, full-size	Linear, full size	ALF_COMPONENT		This value applies to any fitting or valve, where the ports are collinear and of equal size, for example, a gate valve or a flange.	Can be placed in a straight or on an end port.
16	Linear, with size change	Linear, with size change	ALF_RUNCHANGE		This value applies to any fitting or valve, where the ports are collinear, but the sizes differ, for example, a concentric reducer or concentric swage.	Can be placed only on an end port.
20	Elbow, fixed angle	Elbow, fixed angle (including angle valves)	DC_ELBOW		This value applies to any full-size change-of-direction fitting, where the bend angle is constant, that is, the elbow cannot be trimmed, for example a flanged elbow.	Can be placed only at an end port.
25	Elbow, fixed / trimmable angle	Elbow, trimmable	DC_ELBOW		This value applies to any full-size change-of-direction fitting, where the elbow can be trimmed.	Can only be placed at an end port.
30	Elbow, side outlet	Elbow, side outlet	DC_ELBOW		This value applies to any full-size change-of-direction fitting with a side outlet.	Can only be placed at an end port.
35	Elbow, radial outlet	Elbow, radial outlet	DC_ELBOW		This value applies to any full-size change-of-direction fitting with a radial outlet.	Can only be placed at an end port.
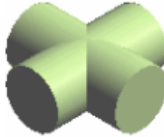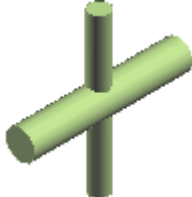
Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
36	Elbow, reducing	Elbow, reducing	DC_REDUCINGELBOW		This value applies to any reducing change-of-direction fitting.	Can only be placed at an end port.
37	Elbow, gooseneck	Elbow, gooseneck	ALF_ENDLEG		This value applies to any full-size gooseneck fitting, for example, a standpipe gooseneck.	Can only be placed at an end port.
40	Return	Return	ALF_ENDLEG		This value applies to any 180° return fitting.	Can only be placed at an end port.
45	Return, bottom outlet	Return, bottom outlet	ALF_ENDLEG		This value applies to any 180° return fitting with a bottom outlet, for example, a biological-pharmaceutical use point with a bottom outlet.	Can only be placed at an end port.
50	Return, side outlet	Return, side outlet	ALF_ENDLEG		This value applies to any 180° return fitting with a side outlet, for example, a biological-pharmaceutical use point with a side outlet.	Can only be placed at an end port.
55	Pipe bend	Pipe bend	DC_BEND			Can only be placed at an end port.
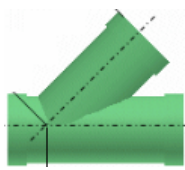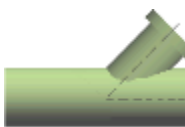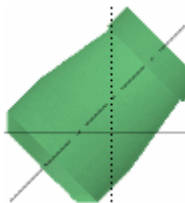
Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
60	Mitered elbow (pre-fabricated part to be purchased)	Miter	DC_MITER		This value applies to any pre-fabricated, mitered, change-of-direction fitting.	Can only be placed at an end port.
65	Eccentric, with size change	Eccentric size change	ALF_RUNC HANGE		This value applies to any fitting or valve, where the inline ports are offset, but the sizes differ, for example, an eccentric reducer or eccentric swage.	Can only be placed at an end port.
66	Eccentric, full size	Eccentric, full size	ALF_RUNC HANGE		This value applies to any fitting or valve, where the inline ports are offset and of equal size, for example an expansion joint with an offset.	Can only be placed at an end port.
70	Concentric size change	Concentric size change	ALF_RUNC HANGE		This value applies to any fitting or valve, where the ports are collinear, but the sizes differ, for example, a concentric reducer or concentric swage.	Can only be placed at an end port.
75	Tee, full size (including 3-way valves)	Tee, full size (including 3-way valves)	BP_HEADE R		This value applies to any full-size tee-type branch fitting or 3-way valve.	Can be placed in a straight or on an end port.
80	Tee, reducing branch	Tee, reducing branch	BP_HEADE R		This value applies to any tee-type branch fitting or 3-way valve with a reducing branch.	Can be placed only on an end port.
85	Tee, eccentric reducing branch	Tee, eccentric reducing branch	ALF_COMP ONENT		This value applies to any tee-type branch fitting or 3-way valve with an eccentric reducing branch.	Can be placed only on an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
90	Tee, reducing run and branch	Tee, reducing run and branch	BP_HEADER		This value applies to any tee-type branch fitting or 3-way valve with a reducing run and a reducing branch.	Can be placed only on an end port.
95	Tee, reducing runs	Tee, reducing runs	BP_HEADER		This value applies to any tee-type branch fitting or 3-way valve with two reducing run legs, for example, a bullhead tee.	Can be placed only on an end port.
100	Tee with offset, full size	Tee with offset, full size	ALF_COMPONENT		This value applies to any full-size tee-type branch fitting or 3-way valve with an offset.	Can be placed only on an end port.
105	Tee with offset, reducing branch	Tee with offset, reducing branch	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with an offset and a reducing branch.	Can be placed only on an end port.
110	Tee with offset, reducing run and branch	Tee with offset, reducing run and branch	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with an offset, a reducing run, and a reducing branch.	Can be placed only on an end port.
115	Tee with offset, reducing runs	Tee with offset, reducing runs	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with an offset and two reducing runs.	Can be placed only on an end port.
120	Tee with double offset, full size	Tee with double offset, full size	ALF_COMPONENT		This value applies to any full-size tee-type branch fitting or 3-way valve with a double offset.	Can be placed only on an end port.
125	Tee with double offset, reducing branch	Tee with double offset, reducing branch	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with a double offset and a reducing branch.	Can be placed only on an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
130	Tee with double offset, reducing run and branch	Tee with double offset, reducing run and branch	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with a double offset, a reducing run, and a reducing branch.	Can be placed only on an end port.
135	Tee with double offset, reducing runs	Tee with double offset, reducing runs	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with a double offset and two reducing runs.	Can be placed only on an end port.
140	Tee, non-symmetrical	Tee, non-symmetrical	ALF_COMPONENT		This value applies to any tee-type branch fitting or 3-way valve with non-symmetrical runs.	Can be placed in a straight or on an end port.
145	Cross, full size (including 4-way valves)	Cross, full size (including 4-way valves)	ALF_COMPONENT		This value applies to any full-size cross-type branch fitting or 4-way valve.	Can be placed in a straight or on an end port.
150	Cross, reducing branches	Cross, reducing branches	ALF_COMPONENT		This value applies to any cross-type branch fitting or 4-way valve with two reducing branches.	Can be placed in a straight or on an end port.
155	Cross, reducing run and one branch	Cross, reducing run and one branch	ALF_COMPONENT		This value applies to any cross-type branch fitting or 4-way valve with a reducing run and a reducing branch.	Can be placed only on an end port.
160	Cross, reducing run and two branches	Cross, reducing run and two branches	ALF_COMPONENT		This value applies to any cross-type branch fitting or 4-way valve with a reducing run and two reducing branches.	Can be placed only on an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
165	Lateral, full-size	Lateral, full size	BP_HEADER		This value applies to any full-size lateral-type branch fitting or valve.	Can be placed in a straight or on an end port.
170	Lateral, reducing branch	Lateral, reducing branch	BP_HEADER		This value applies to any lateral-type branch fitting or valve with a reducing branch.	Can be placed in a straight or on an end port.
175	Lateral, reducing run and branch	Lateral, reducing run and branch	BP_HEADER		This value applies to any lateral-type branch fitting or valve with a reducing run and a reducing branch.	Can be placed only on an end port.
180	Lateral reducing runs	Lateral reducing runs	BP_HEADER		This value applies to any lateral-type branch fitting or valve with two reducing runs.	Can be placed only on an end port.
185	Olet-type branch, fixed angle	Olet-type branch, fixed angle	BF_BRANCH		This value applies to any olet-type branch fitting, where the branch angle is constant, that is, the olet-type branch cannot be trimmed.	Can only be placed on a straight.
186	Olet-type branch, variable angle	Olet-type branch, variable angle	BF_BRANCH		This value applies to any olet-type branch fitting, where the olet-type branch can be trimmed.	Can only be placed on a straight.
187	Olet-type branch, double outlet	Olet-type branch, double outlet	ALF_COMPONENT		This value applies to any olet-type branch fitting with two outlets.	Can be placed only in a straight.
190	Latrolet®-type branch	Latrolet®-type branch	BF_BRANCH		This value applies to any olet-type branch fitting, where the acute branch angle is less than 90°.	Can only be placed on a straight.
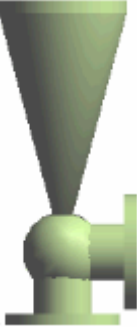
Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
195	Non-radial branch	Non-radial branch	BF_BRANCH		This value applies to any olet-type branch fitting, where the branch centerline is offset from the header centerline.	Can only be placed on a straight.
200	Endolet-type branch (Flatolet)	Endolet-type branch	ALF_COMPONENT		This value applies to any olet-type branch fitting that, due to the branch size being so small and the run size so large, the branch fitting is basically flat on the bottom.	Can be placed only in a straight.
205	Elbolet	Elbolet	ALF_RUNCHANGE		This value applies to any elbolet-type branch fitting, where the elbolet fitting is used to branch from a change-of-direction fitting.	Can only be placed at an end port.
210	True Y-type branch	True Y-type branch	ALF_ENDLEG		This value applies to any wye-type branch fitting or valve.	Can only be placed at an end port.
215	Double Y-type branch	Double Y-type branch	ALF_ENDLEG		This value applies to any double wye-type branch fitting or valve.	Can only be placed at an end port.
220	Closing fitting (including instrument indicators and instrument transmitters)	Closing (including instrument indicators)	EF_ENDFEATURE		This value applies to any closing fitting, for example, a cap, a plug, a blind flange, an instrument indicator, or an instrument transmitter. By definition, a closing fitting has one port.	Can only be placed at an end port.
225	Orifice flange	Orifice flange	ALF_COMPONENT		This value applies to any flange with three or more ports.	Can be placed in a straight or on an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
230	Multi-port valve	Multi-port valve	ALF_ENDLEG		This value applies to any multiport valve.	Can only be placed at an end port.
235	Surface-mounted	Surface-mounted	SMC_FEATURE		This value applies to any surface-mounted fitting other than a wall penetration fitting, for example a centering flange or a surface-mounted instrument.	Can only be placed on a straight.
240	Tandem valve, horizontal main at drain angle with vertical tandem	Tandem valve, horizontal main at drain angle with vertical tandem	ALF_COMPONENT		This value applies to any sanitary or aseptic tandem valve, where the drainage geometry is described in this manner.	Can be placed in a straight or on an end port.
245	Tandem valve, horizontal main with vertical tandem	Tandem valve, horizontal main with vertical tandem	ALF_COMPONENT		This value applies to any sanitary or aseptic tandem valve, where the drainage geometry is described in this manner.	Can be placed in a straight or on an end port.
250	Tandem valve, vertical main with tandem at drain angle	Tandem valve, vertical main with tandem at drain angle	ALF_COMPONENT		This value applies to any sanitary or aseptic tandem valve, where the drainage geometry is described in this manner.	Can be placed in a straight or on an end port.
255	Tandem valve, horizontal main with tandem at drain angle	Tandem valve, horizontal main with tandem at drain angle	ALF_COMPONENT		This value applies to any sanitary or aseptic tandem valve, where the drainage geometry is described in this manner.	Can be placed in a straight or on an end port.
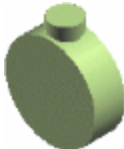
Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
256	Angle valve	Angle valve	ALF_ENDLEG		This value applies to any full-size, change-of-direction valve.	Can only be placed at an end port.
257	Angle valve, reducing	Angle valve, reducing	DC_REDUCINGELBOW		This value applies to any reducing, change-of-direction valve.	Can only be placed at an end port.
260	Valve fitting/assembly, horizontal valve with vertical fitting access	Valve/fitting assembly, horizontal main at drain angle with vertical access on primary side of center	ALF_ENDLEG		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.
265	Valve fitting/assembly, horizontal valve at drain angle with vertical fitting access	Valve/fitting assembly, horizontal main at drain angle with vertical access on secondary side of center	ALF_ENDLEG		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
270	Valve fitting/assembly, horizontal valve at drain angle with horizontal fitting access	Valve/fitting assembly, horizontal main at drain angle with horizontal access at drain angle	ALF_ENDLE G		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.
275	Valve fitting/assembly, vertical valve with horizontal fitting access	Valve/fitting assembly, vertical main with horizontal access at drain angle below main center	ALF_ENDLE G		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.
280	Valve/fitting assembly, vertical main with horizontal access at drain angle below main center and 45° from assembly center	Valve/fitting assembly, vertical main with horizontal access at drain angle below main center and 45° from assembly center	ALF_ENDLE G		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.
285	Valve/fitting assembly, vertical main with horizontal access at drain angle above main center	Valve/fitting assembly, vertical main with horizontal access at drain angle above main center	ALF_ENDLE G		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.
290	Valve/fitting assembly, vertical main with horizontal access at drain angle above main center and 45° from assembly center	Valve/fitting assembly, vertical main with horizontal access at drain angle above main center and 45° from assembly center	ALF_ENDLE G		This value applies to any sanitary or aseptic access valve with an access fitting assembly, where the drainage geometry is described in this manner.	Can only be placed at an end port.

Number	Short Description	Long Description	Route Feature Type	Picture of a Typical Component	Description	Placement Restrictions
295	Lift check valve, horizontal orientation only	Lift check valve, horizontal orientation only	ALF_COMPONENT		This value applies to any flow-dependent valve, where the valve can only be installed in a horizontal pipe run.	Can be placed only on an end port.
300	Lift check valve, vertical orientation only	Lift check valve, vertical orientation only	ALF_COMPONENT		This value applies to any flow-dependent valve, where the valve can only be installed in a vertical pipe run.	Can be placed in a straight or on an end port.
305		Fitting with multiple branches, e.g. bleed ring or drip ring tree	ALF_ENDLEG		This value applies to any circular fitting with multiple branches, for example, bleed ring or drip ring tee.	Can only be placed at an end port.
310	Wall penetration fitting	Wall penetration fitting	SMC_FEATURE		This value applies to any surface-mounted fitting, for example, a penetration sleeve, where the fitting is to be aligned with a hole in a wall or other structure.	Can only be placed on a straight.
315	Clamp-on fitting	Clamp-on fitting	SMC_FEATURE		This value applies to any clamp-on fitting, for example, a clamp-on saddle or a clamp-on flow sensor.	Can only be placed on a straight.
500	Generic	Generic	ALF_ENDLEG		This value applies to any other fitting.	Can only be placed at an end port.

Grid Plane Type

The **Grid Plane Type** select list (codelist) defines the grid planes available for use in the model.

This select list is used in the Grids task. The list is delivered in GridsCodelist.xls and belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Hand Wheel Orientation

The **Hand Wheel Orientation** select list (codelist) defines the rotation angles available for instrument hand wheels.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Handrail Connection Type

The **Handrail Connection Type** select list (codelist) defines the connection types for handrails.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Handrail End Treatment

The **Handrail End Treatment** select list (codelist) defines the end treatments for handrails.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Handrail Inline Connection Type

The **Handrail Inline Connection Type** select list (codelist) defines the inline connection types available for handrails.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Handrail Offset

The **Handrail Offset** select list (codelist) defines the offset for handrails in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Handrail Orientation

The **Handrail Orientation** select list (codelist) defines the orientation of handrails.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Handrail Side Connection Type

The **Handrail Side Connection Type** select list (codelist) defines the side connections available for handrails.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Hazardous Fluid Category

The **Hazardous Fluid Category** select list (codelist) defines the different hazardous fluid services available for use in the model.

This codelist is used in multiple tasks. The list belongs to the UDP namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Hazardous Fluid Classification), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Header Branch Size Basis Option

The **Header Branch Size Basis Option** select list (codelist) enables the specification writer to designate whether the Header Size and Branch values for the Branch Intersection Rule are determined automatically based on the size ranges for the pipe stock and branch nipples in the piping commodity filter, or based on the sizes in the Permissible Nominal Piping Diameters Rule for the applicable piping materials class.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Heat Tracing Medium

The **Heat Tracing Medium** select list (codelist) defines heat tracing requirements, types, and media available for use in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⦿ WARNING This is a hierarchical select list. In the Parent select lists (Heat Tracing Requirement and Heat Tracing Type), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

HngSup Associated Part Type

The **HngSup Associated Part Type** select list (codelist) specifies the available associated part types for hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⦿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Association Type

The **HngSup Association Type** select list (codelist) specifies the available association types for hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⦿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup BOM Type

The **HngSup BOM Type** select list (codelist) specifies the different types of bills of materials (BOM).

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⦿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Bounding Box Type

The **HngSup Bounding Box Type** select list (codelist) specifies the different types of bounding boxes.

This select list is used in the Hangers and Supports task. The list belongs to the UDP namespace.

HngSup Class Node Type

The **HngSup Class Node Type** select list (codelist) specifies the available hangers and supports classification nodes.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

HngSup Command

The **HngSup Command** select list (codelist) specifies the available types of commands for the hangers and supports part classes.

This select list is used in the Hangers and Supports task. The list belongs to the CMNSCH namespace.

⊕ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Connect Obj

The **HngSup Connect Obj** select list (codelist) specifies the hangers and supports connectable object types.

This select list is used in the Hangers and Supports task. The list belongs to the CMNSCH namespace.

⊕ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Connection Type

The **HngSup Connection Type** select list (codelist) specifies the available connection types for hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⊕ WARNING This is a hierarchical select list. In the parent select list (HngSup Connection Type), you can edit the delivered text of the short or long descriptions as long as you do not

change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

HngSup Cut Type

The **HngSup Cut Type** select list (codelist) specifies the available cut types for hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Discipline

The **HngSup Discipline** select list (codelist) specifies the available disciplines for the hangers and supports part classes.

This select list is used in the Hangers and Supports task. The list belongs to the CMNSCH namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup ET Type

The **HngSup ET Type** select list (codelist) specifies the available end treatments for hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Face Selection Type

The **HngSup Face Selection Type** select list (codelist) defines the faces available for selection.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

HngSup Joint Type

The **HngSup Joint Type** select list (codelist) specifies the available joint types for hangers and supports joints.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Manufacturer

The **HngSup Manufacturer** select list (codelist) specifies the available hangers and supports manufacturers.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

HngSup Mating Joint Type

The **HngSup Mating Joint Type** select list (codelist) defines the mating types available at joints, specifically symbol ports for support parts.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

HngSup Part Class Type

The **HngSup Part Class Type** select list (codelist) defines a list of part class types for hangers and supports. Part class types for other disciplines are listed in the **Part Class Types** select list.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

HngSup Physical Connection

The **HngSup Physical Connection** select list (codelist) defines the physical connection types for hangers and supports component ports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select lists (HngSup Connection Info Discipline and HngSup Connection Info Type), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

HngSup Port Category

The **HngSup Port Category** select list (codelist) defines symbol port categories.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Port Type

The **HngSup Port Type** select list (codelist) defines symbol port types.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Rule Type

The **HngSup Rule Type** select list (codelist) specifies types of rules.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Strict Face Selection

The **HngSup Strict Face Selection** select list (codelist) specifies whether or not to force strict face selection during placement of hangers and supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HngSup Support Type

The **HngSup Support Type** select list (codelist) specifies the different types and disciplines of supports.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ **WARNING** This is a hierarchical select list. In the Parent select list (SupportDiscipline), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

HngSup Type Selection Rule

The **HngSup Type Selection Rule** select list (codelist) specifies the values describing the locations of supports relative to routed objects.

This select list is used in the Hangers and Supports task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Hs Beam Clamp Bot Shape

The **HsBeamClampBotShape** select list (codelist) specifies the shape of HS_BeamClamp smart parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs BOM Len Units

The **HsBOMLenUnits** select list (codelist) specifies the units to be used on the Bill of Materials.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Clamp Cfg

The **HsClampCfg** select list (codelist) provides information for HS_Shoe SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Clevis Bot Shape

The **HsClevisBotShape** select list (codelist) provides shape information for HS_Shoe SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Clevis Top Shape

The **HsClevisTopShape** select list (codelist) provides shape information for HS_Shoe SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Clip Shape

The **HsClipShape** select list (codelist) provides shape information for HS_BeamClamp SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Constant Alignment

The **HsConstantAlignment** select list (codelist) provides information for HS_ConstantSprint SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Constant Config

The **HsConstantConfig** select list (codelist) provides information for HS_ConstantSpring SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Constant Suspension

The **HsConstantSuspension** select list (codelist) provides information for HS_ConstantSpring SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Corner Shape

The **HsCornerShape** select list (codelist) provides information for HS_Plate SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Cutback Anchor Point

The **HSCutbackAnchorPoint** select list (codelist) provides anchor point locations for HS Cutback Steel parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Design Support Type

The **HSDesignSupportType** select list (codelist) enables the support type design to be Around Pipe or Around Insulation.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Direction

The **HsDirection** select list (codelist) provides information for HS_Nut SmartParts including HexNut and EyeNut.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Drawing Template

The **HsDrawingTemplate** select list (codelist) provides the Drawing Template property for all supports.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Dummy Stanc Shape

The **HsDummyStancShape** select list (codelist) provides information for HS_Stanchion SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Extension Type

The **HsExtensionType** select list (codelist) provides information for HS_Shoe SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Face Port Orient

The **HSFacePortOrient** select list (codelist) provides information for trimming Rich Hgr Beam parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Frame Configuration

The **HSFrameConfiguration** select list (codelist) defines the configuration for frame assemblies.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Frame Orientation

The **hsFrameOrientation** select list (codelist) defines the orientation for frame assemblies.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Frame Type

The **hsFrameType** select list (codelist) defines the frame type for frame assemblies.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Frame Weld Location

The **hsFrameWeldLocation** select list (codelist) defines the weld location for frame assemblies.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Hgr Beam Type

The **HsHgrBeamType** select list (codelist) provides the option of Cutback Steel or Snipped Steel for RichHgrBeam parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Include Bolts

The **HSIncludeBolts** select list (codelist) provides information for Stanchion and DummyLeg SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Load Class

The **HsLoadClass** select list (codelist) defines classifications for hanger loads.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Lug Shape

The **HSLugShape** select list (codelist) provides information for HS_ElbowLug SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Malleable Config

The **HSMalleableConfig** select list (codelist) provides information for HS_MalleableBeamClamp SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Multi Locate By

The **HsMultiLocateBy** select list (codelist) is used by many SmartPart classes: YokeClamp, SplitPipeRing, RiserClamp, Shield, BlockClamp, Shoe, Stanchion and DummyLeg. The property provides the option to locate from Center or Edge.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Orientation

The **HSOrientation** select list (codelist) is used with YokeClamp SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Pin or Lug

The **HsPinOrLug** select list (codelist) is used with YokeClamp SmartParts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

HS Riser Lug Side

The **hsRiserLugSide** select list (codelist) defines position for riser assemblies.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Rod Center Type

The **hsRodCenterType** select list (codelist) defines the type of center for rod parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Rod End Type

The **hsRodEndType** select list (codelist) defines the type of end for rod parts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Selection

The **hsSelection** select list (codelist) specifies the overhang for steel sections as By Rule or By Input.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

O WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Hs Shape Type

The **hsShapeType** select list (codelist) defines the shape of the nut part.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Shoe Type

The **hsShoeType** select list (codelist) defines the shape of the shoe part.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Simp Shape Type

The **hsSimpShapeType** select list (codelist) defines the shape for HS_WBAHole smartparts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Smart Shape Type

The **hsSmartShapeType** select list (codelist) defines the shape for various smartparts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Spring Movement Dir

The **hsSpringMovementDir** select list (codelist) defines if the spring movement for variable spring smartparts is up or down.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Steel Corner Connection

The **hsSteelCornerConnection** select list (codelist) defines connection types for internal steel connections within a support.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Steel Orientation Angle

The **hsSteelOrientationAngle** select list (codelist) defines the orientation angle for steel sections.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Steel Standard

The **hsSteelStandard** select list (codelist) defines the standard for the steel sections.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Steel Tee Connection

The **hsSteelTeeConnection** select list (codelist) defines the connection type for steel tee sections.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Structure Connection

The **hsStructureConnection** select list (codelist) defines the connection details for frame assemblies as normal, lapped or lapped opposite.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Strut Config

The **hsStructConfig** select list (codelist) defines the configuration of the hanger as Direct (Angle from Structure) or Vertical (Angle from Vertical).

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Strut End Orientation

The **hsStrutEndOrientation** select list (codelist) defines the orientation of the strut end.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DAssy_Codelist.xls and belongs to the UDP namespace.

Hs Sup Catalog

The **hsSupCatalog** select list (codelist) defines catalog information to be used in part names and part selection rules.

This select list is used in the Hangers and Supports task. The list is delivered in HS_System_Codelist.xls and belongs to the UDP namespace.

Hs Vert Horiz

The **hsVertHoriz** select list (codelist) defines the Hs_SlidePlate as vertical or horizontal.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Hs WBA Hole Config

The **hsWBAHoleConfig** select list (codelist) defines the configuration for Hs_WBAHole smartparts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

Hs Yes No

The **hsYesNo** select list (codelist) is used as a Yes/No attribute for various smartparts.

This select list is used in the Hangers and Supports task. The list is delivered in HS_S3DParts_Codelist.xls and belongs to the UDP namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HVAC Component Types

The **HVAC Component Types** select list (codelist) specifies duct component types.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HVAC Lining Material

The **HVAC Lining Material** select list (codelist) specifies the lining requirements and materials for duct.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (HVAC Lining Requirements), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

HVAC Part Data Basis

The **HVAC Part Data Basis** select list (codelist) specifies the values for the basis of the dimensional data for HVAC parts. The purpose of this property is to recognize those components that require special treatment when interpreting the dimensional data.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HVAC Part Generation Basis

The **HVAC Part Generation Basis** select list (codelist) specifies whether to enable breaks on feature boundaries for HVAC systems.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

HVAC Width and Depth Basis

The **HVAC Width and Depth Basis** select list (codelist) provides options for the width and depth dimensions of HVAC.

This select list is used in the HVAC task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Icarus Column Base Option

The **Icarus Column Base Option** select list (codelist) specifies the types of connections at column bases.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

♀ TIP Icarus is a cost-estimation software package.

Icarus Concrete Type

The **Icarus Concrete Type** select list (codelist) specifies the types of concrete.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

♀ TIP Icarus is a cost-estimation software package.

Icarus Exclude End Bent

The **Icarus Exclude End Bent** select list (codelist) specifies options for exclusion of end bents.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

♀ TIP Icarus is a cost-estimation software package.

Icarus Grating Type

The **Icarus Grating Type** select list (codelist) specifies the types of gratings.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

♀ TIP Icarus is a cost-estimation software package.

Icarus Pipe Rack Type

The **Icarus Pipe Rack Type** select list (codelist) specifies the types of pipe racks.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

TIP Icarus is a cost-estimation software package.

Icarus Struct Steel Analysis

The **Icarus Struct Steel Analysis** select list (codelist) specifies the types of stress analysis.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

TIP Icarus is a cost-estimation software package.

Icarus Third Column

The **Icarus Third Column** select list (codelist) specifies third column options.

This select list is used in the Space Management task. The list belongs to the UDP namespace.

TIP Icarus is a cost-estimation software package.

IFC Process Status

The **IFC Process Status** select list (codelist) defines the status of the interference process on the server.

This select list is used in the interference checking process. The list belongs to the CMNSCH namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

IFC Required Action

The **IFC Required Action** select list (codelist) defines the actions that users can take regarding interferences. For example, one action is to ignore the interference.

This select list is used in the interference checking process. The list belongs to the CMNSCH namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

IFC Type

The **IFC Type** select list (codelist) defines the different types of interferences that appear.

This select list is used in the interference checking process. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Ignore Boundaries

The **Ignore Boundaries** select list (codelist) is a Boolean (Yes/No) list that specifies whether or not the software searches beyond boundaries to find intrinsic breaks during WBS item creation.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Industry Commodity Code Option

The **Industry Commodity Code Option** select list (codelist) defines options for commodity codes. Refer to the Default Project Options Sheet topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Inlet Port Geometry Type

The **Inlet Port Geometry Type** select list (codelist) defines options for the inlet port geometry on diverter valves.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Installation Responsibility

The **Installation Responsibility** select list (codelist) defines the list of parties available for installation responsibility.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Instrument Functional Type

The **Instrument Functional Type** select list (codelist) defines the different types of instruments available in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING This is a hierarchical select list. In the Parent select lists (Instrument Functional Class and Instrument Functional Sub Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

Insulation Material

The **Insulation Material** select list (codelist) defines all the insulation materials available for use in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Insulation Purpose

The **Insulation Purpose** select list (codelist) defines all the insulation purposes available for use in the model.

This select list is used in multiple tasks. This list belongs to the CMNSCH namespace.

WARNING This is a hierarchical select list. In the Parent select lists (Insulation Requirement and Insulation Type), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

Insulation Temperature Basis

The **Insulation Temperature Basis** select list (codelist) defines options for temperature basis. This information is used during insulation design. For example, the basis can be the normal operating temperature.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Insulation Thickness Basis

The **Insulation Thickness Basis** select list (codelist) defines all the insulation thicknesses available for use in the model.

This select list is used in multiple tasks. The list belongs to the UDP namespace.

IntelliShip Data Integrity Msgs

The **IntelliShip Data Integrity Msgs** select list (codelist) defines database integrity messages.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

IntelliShip Msgs

The **IntelliShip Msgs** select list (codelist) defines the messages for the To Do List in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Interior Surface Treatment

The **Interior Surface Treatment** select list (codelist) defines the interior surface treatments available for use in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

WARNING This is a hierarchical select list. In the Parent select list (Interior Surface Treatment Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Is Bend Planar

The **Is Bend Planar** select list (codelist) specifies the options for whether or not the centerline of a pipe bend configuration lies within a single plane.

The following picture shows a non-planar pipe bend configuration.
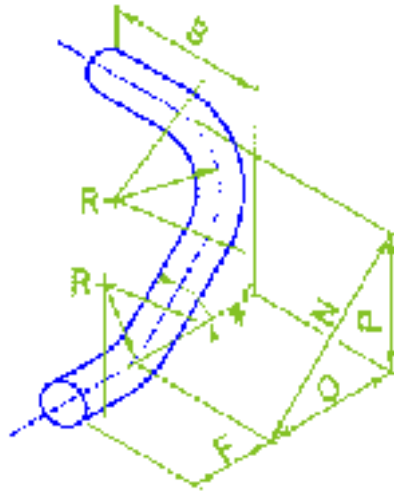
This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Is Valve Operator Rotatable

The **Valve Operator Is Rotatable** select list (codelist) specifies the rotating options available for valve operators.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Jacketed Closure Method

The **Jacketed Closure Method** select list (codelist) defines the methods by which the end of jacketed pipe is closed.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Jacketed Piping Basis

The **Jacketed Piping Basis** select list (codelist) specifies whether a piping commodity applies to the core piping or the jacketed piping.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Lining Material

The **Lining Material** select list (codelist) defines the lining materials available for a piping commodity. Some examples of lining materials are concrete, epoxy, rubber, and plastic. Refer to the Piping Materials Class Data Sheet topic in the *Piping Reference Data Guide* for more information on how this select list is used.

The lining material select list has a dependent property called lining requirements that identifies whether a specific value of the lining material is interpreted as lined or not lined.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Lining Requirements), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Load Case Liquid Pressure

Load Case Liquid Pressure specifies liquid pressure ratings for load cases on compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

💡 TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **LoadCasLiquidPressure**.

Load Case Sea Pressure

Load Case Sea Pressure specifies sea pressure ratings for load cases on compartments. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

💡 TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **LoadCaseSeaPressure**.

Load Span Classification

The **Load Span Classification** select list (codelist) defines the load span classification standards for raceway.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Load Span Classification Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Longitudinal Beam Category

The **Longitudinal Beam Category** select list (codelist) defines the available categories for longitudinal beams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Longitudinal Bulkhead Category

The **Longitudinal Bulkhead Category** select list (codelist) defines the available categories for longitudinal bulkheads in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Longitudinal Profile Category

The **Longitudinal Profile Category** select list (codelist) defines the available categories for longitudinal profiles in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Longitudinal Seam Category

The **Longitudinal Seam Category** select list (codelist) defines the available categories for longitudinal seams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Longitudinal Tube Category

The **Longitudinal Tube Category** select list (codelist) defines the available categories for longitudinal tubes in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Loose Material Requirements

The **Loose Material Requirements** select list (codelist) defines the options for any loose material created with a piping commodity, even though the loose material is supplied by the vendor. In some situations, it is necessary to track such loose material for construction purposes, although the loose material is not managed by the material control system.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Mach Bolt Length Round Off Option

The **Mach Bolt Length Round Off Option** select list (codelist) specifies the available methods for machine bolt length round-off in machine bolt length calculations.

After the bolt length has been computed, the length of the machine bolt must be rounded to a practical value.

The specification writer can choose to specify a simple round off to be applied, or no round off; or can choose to define the algorithm to round off the machine bolt length on the basis of a list of the available purchased, or preferred, machine bolt lengths, as a function of the machine bolt diameter, and optionally the materials grade of the machine bolt.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Manufacturer

The **Manufacturer** select list (codelist) defines the list of manufacturers of piping commodities. The manufacturers are grouped into categories of industry practices.

Specifically, this select list is intended to be used when the geometric industry standard identifies the industry standard, but the specification writer is required to track the manufacturer for reporting purposes. Typically, this value is imported from a material control system, if required.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Manufacturer Industry Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Manufacturing Method

The **Manufacturing Method** select list (codelist) specifies the method of manufacturing for plain piping and nipples.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Map Type

The **Map Type** select list (codelist) defines the type of symbol mapping for isometric drawings.

This select list is used in the Drawings and Reports task. The list belongs to the REFDAT namespace.

Material Description Builder Option

The **Material Description Builder Option** select list (codelist) specifies the options that specify whether material descriptions are created automatically for piping commodities, stock piping specialties, and stock instruments on the basis of embedded labels.

This option is only applicable when the Commodity Code Builder option has been enabled.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⓿ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Materials Grade

The **Materials Grade** select list (codelist) defines the many different grades of materials that you plan to use in your model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⓿ **WARNING** This is a hierarchical select list. In the Parent select lists (Materials Grade Practice and Materials Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

Materials of Construction Class

The **Materials of Construction Class** select list (codelist) defines the different classes of piping materials.

The materials of construction class property is not the same as the materials grade property. The materials grade is specific to each fitting within a piping materials class. As an example, forged fittings have a different materials grade than welded fittings.

The materials of construction class select list is intended for grouping similar piping materials classes for the benefit of the specification writer in managing piping specifications. As an example, consider three piping specifications, which all use carbon steel ASTM-A106B and ASTM-A53-B pipe; all are the same pressure class, CL150; and all use trim 8 valves. However, the fluid service designation and the service limits vary among these piping materials classes.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Materials Type

The **Materials Type** select list (codelist) defines the many different groups and types of materials that you plan to use in your model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Materials Group), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Member Fireproofing Application Method

The **Member Fireproofing Application Method** select list (codelist) defines the methods that are available to apply fireproofing to an object.

This select list is used by the Structure task and belongs to the UDP name space.

Member Fireproofing Application Type

The **Member Fireproofing Application Type** select list (codelist) defines the fireproofing type to apply to the object (contour fully encased, contour flange exposed, and so forth).

This select list is used by the Structure task and belongs to the UDP name space.

Member Fireproofing Exposure Type

The **Member Fireproofing Exposure Type** select list (codelist) defines the fireproofing exposure type (exterior or interior).

This select list is used by the Structure task and belongs to the UDP name space.

Member Orientation

The **Member Orientation** select list (codelist) specifies the default direction in the global coordinate system for the local z-axis of the structural section.

The only entry in this select list that is used is the ZX-axis rule. This rule is described as follows: The local z-axis of the member is parallel to the global Z-axis by default. However, if you rotate the member such that the local x-axis of the member (along the member line) becomes parallel to the global Z-axis, then the software switches the local z-axis of the member to be parallel to the positive global X-axis.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Methods of Jacket Pipe Construction

The **Methods of Jacket Pipe Construction** select list (codelist) specifies rules for providing jackets for pipe couplings and other connections. Refer to the *Piping Reference Data Guide* for more information on the default piping commodity selection rule.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Methods of Trimming

The **Methods of Trimming** select list (codelist) specifies rules for trimming piping branches and other connections. For example, it might be necessary to trim the welded end of a flange at a nozzle in order to align with a sloped run of plain piping. Refer to the Port Alignment topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

MICode_ChannelFinish

The **MICode_ChannelFinish** select list (codelist) specifies the available finishes for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_ChannelSize

The **MICode_ChannelSize** select list (codelist) specifies the available channel sizes for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_ClampRot

The **MICode_ClampRot** select list (codelist) specifies the available clamp rotations for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_Connection

The **MICode_Connection** select list (codelist) specifies the available connection types for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_Connection2

The **MICode_Connection2** select list (codelist) specifies the available connection types for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_Connection3

The **MICode_Connection3** select list (codelist) specifies the available connection types for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_ConnectionSize

The **MICode_ConnectionSize** select list (codelist) specifies the available connector types for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_Default

The **MICode_Default** select list (codelist) specifies the available default part for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_Girder

The **MICode_Girder** select list (codelist) specifies the available girders for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_GirderDimension

The **MICode_GirderDimension** select list (codelist) specifies the available girder sizes for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_M12Anchors

The **MICode_M12Anchors** select list (codelist) specifies the available anchors for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_M16Anchors

The **MICode_M16Anchors** select list (codelist) specifies the available anchors for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_NumClamps

The **MICode_NumClamps** select list (codelist) specifies the number of clamps for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_ShoeH

The **MICode_ShoeH** select list (codelist) specifies the shoe height for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_ShoeH2

The **MICode_ShoeH2** select list (codelist) specifies the second shoe height for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_SteelSide

The **MICode_SteelSide** select list (codelist) specifies which side mounts to the steel for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

MICode_WithWithout

The **MICode_WithWithout** select list (codelist) is used for Hilti_MI hangers and supports. The select list is used in the Hangers and Supports task. The list is delivered in HS_Hilti_MIParts_Codelist.xls. The list belongs to the UDP namespace.

Min Bend To Bend Tangent Len Option

The **Min Bend To Bend Tangent Len Option** sheet defines values that provide the specification writer with the ability to specify both standard and non-standard minimum bend-to-bend tangent lengths for each type of pipe bend configuration.

The specification writer can provide standard minimum tangent lengths and any number of alternate minimum tangent lengths, similar to the Commodity Option in the piping commodity filter. In other words, alternate minimum tangent lengths are possible on the same bending machine.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Mirror Behavior Option

The **Mirror Behavior Option** select list (codelist) defines available mirroring options for objects in the model.

The mirror behavior options include the following values.

- The component can be mirrored.

- The component cannot be mirrored or rotated but can be copied and translated.

- The component is asymmetrical and mirroring results in an orientation of the component that is not representative of that component type. However, a 180 degree rotation results in the component's connection points remaining aligned with the adjacent routing. In this situation, the software rotates the component by 180 degrees.

- The component is asymmetrical and mirroring results in an orientation of the component that is not representative of that component type. However, in this situation, the component is replaced by one with the appropriate orientation.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Misc Requisition Classification

The **Misc Requisition Classification** select list (codelist) organizes piping commodities in a meaningful way for the purposes of requisitioning.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Misc Requisition Component Type), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

MQCode_Material

The **MQCode_Material** select list (codelist) specifies values for the material types to be used on a Hilti_MQ part.

This select list is used in the Hangers and Supports task. It belongs to the UDP namespace.

MQCode_NumBrace

The **MQCode_NumBrace** select list (codelist) specifies values for the number of braces to be used on a Hilti_MQ part.

This select list is used in the Hangers and Supports task. It belongs to the UDP namespace.

MQCode_NumPlate

The **MQCode_NumPlate** select list (codelist) specifies values for the number of plates to be used on a Hilti_MQ part.

This select list is used in the Hangers and Supports task. It belongs to the UDP namespace.

Multiport Valve Op Req

The **Multiport Valve Op Req** select list (codelist) specifies the options for whether or not multiport valve operators are required for a valve body.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Note Purpose

The **Note Purpose** select list (codelist) defines the different types of notes for objects in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Nozzle Entrance Type

The **Nozzle Entrance Type** select list (codelist) defines the choices for types of nozzle entrances. For example, the type can be radial or axial.

This select list is used in the Piping task and is also used in an integrated environment. The list belongs to the UDP namespace.

Nozzle Flange Type

The **Nozzle Flange Type** select list (codelist) defines the types for nozzle flanges.

This select list is used in the Piping task and is also used in an integrated environment. The list belongs to the UDP namespace.

Nozzle Function

The **Nozzle Function** select list (codelist) defines the different functions possible for nozzles.

This select list is used in the Piping task and is also used in an integrated environment. The list belongs to the UDP namespace.

Nut Creation Option

The **Nut Creation Option** select list (codelist) defines the options for nut creation.

By default, the software creates nuts at a bolted joint. The specification writer can disable nut creation when nuts are not tracked for material management purposes.

Even if this option is disabled, the specification writer can still use the nut height for the bolt length calculation if the nut selection filter and accompanying nut part data are defined in the catalog.

In other words, the nut selection filter, and the accompanying nut part data, may be used for bolt length calculations, even when this option has been disabled. In this situation, the nut height, as well as the bolt extension, will be included in the bolt length calculation, although the bolt extension will be expected to not consider the nut height.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Nut Option

The **Nut Option** select list (codelist) specifies the optional nut selections that can be enabled by the specification writer.

A default nut option represents the nut that should be used when the piping designer has not explicitly selected one. The nut option, if applicable, is selected by the piping designer at a bolted joint.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Nut Type

The **Nut Type** select list (codelist) defines the list of nuts available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Open or Blind Spacer Install State

The **Open or Blind Spacer Install State** select list (codelist) shows whether the open spacer or the blind spacer has been installed.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Opening Category

The **Opening Category** select list (codelist) defines the available categories for openings in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Orifice Flange Tap Orientation

The **Orifice Flange Tap Orientation** select list (codelist) defines the locations available for the placement of taps.

The piping specification writer must specify whether the two taps are oriented 180 degrees apart on the outside diameter of the flange or 90 degrees apart. This select list defines those options.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Outlet Port Geometry Type

The **Outlet Port Geometry Type** select list (codelist) defines options for the outlet port geometry on diverter valves.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Painting Responsibility

The **Painting Responsibility** select list (codelist) defines the list of parties available for doing painting work.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Part Class Types

The **Part Class Types** select list (codelist) defines the available part classes in the software.

When you define a part class in a reference data workbook, you type the name of a part class type in the **Definition** section on each part class sheet.

This select list is used in multiple tasks. The list belongs to the REFDAT namespace.

⬤ **WARNING** Do not edit the text under **Specific Part Class**. However, you may edit the text under **Generic Part Class**.

Part Data Basis

The **Part Data Basis** select list (codelist) specifies the values for the basis of the dimensional data defined in piping commodity part data. The purpose of this property is to recognize those components that require special treatment when interpreting the dimensional data.

For example, the symbols for linear fittings and valves are designed on the basis of a face-to-face dimension. However, if the manufacturer provides the face-to-center dimension, the symbol can be designed to react accordingly on the basis of this property.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Part Data Source

The **Part Data Source** select list (codelist) specifies the source of the part data in the piping catalog. If a value has not been specified, the source of the data is assumed to be the piping commodity class data. For example, you can specify that certain data, such as gasket type and gasket material, reside in the gasket part data.

This property provides the means to recognize that a reportable piping commodity is not a generic piping commodity, but might be a gasket, a bolt, or a cap screw. For example, a clamp typically implies that a gasket is included as a reportable piping commodity.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Pipe Bend Radius By User Option

The **Pipe Bend Radius By User Option** select list (codelist) is used to specify whether piping designers can override the pipe bend radius in the piping specification. Refer to the Default Project Options topic in the Piping Referenc*e Data Guide for more infor*mation on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Pipe Bend Radius Multiplier Option

The **Pipe Bend Radius Multiplier** select list (codelist) defines the options for determining the absolute bend radius value. The absolute bend radius can be the product of the nominal piping diameter and the pipe bend radius multiplier, or as the product of the outside diameter and the pipe bend radius multiplier, or as a rule based on the nominal piping diameter and the pipe bend radius multiplier.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Pipe Bend Type

The **Pipe Bend Type** select list (codelist) defines the different types of pipe bend configurations.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Pipe Bending Machine Type

The **Pipe Bending Machine Type** select list (codelist) specifies the different types of bending machines.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Pipe Stock Usage

The **Pipe Stock Usage** select list (codelist) specifies the uses for pipe stock.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Piping Commodity Catalog Part Number Basis Option

The **Piping Commodity Catalog Part Number Basis Option** select list (codelist) defines the options for defining a piping commodity catalog part number.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Piping Commodity Override Option

The **Piping Commodity Override Option** select list (codelist) defines the options for piping commodity overrides in a piping material class.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Piping Commodity Procurement Data Option

The **Piping Commodity Procurement Data Option** select list (codelist) defines options for the piping commodity procurement data. The data can be based on the contractor commodity code or the industry commodity code.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Piping Commodity Type

The **Piping Commodity Type** select list (codelist) is used to create the hierarchy in the Catalog task.

This select list is used in the Piping task and in the Catalog task for the piping parts hierarchy. The list belongs to the REFDAT namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select lists (Piping Commodity Class and Piping Commodity Sub Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent lists.

The following list documents the required usage of selected values of the Piping Component Subclass property.

Piping Component Subclass Value and Purpose

- Stub Ends Bolt Length Calculations - Used to determine whether lap thickness is to be considered.

- Lap Joint Flanges Bolt Length Calculations - Used to determine whether lap thickness is to be considered.

- Flared Pipe Rule - Used to determine whether the pipe stock is to be flared.

- Unions – Used to determine the extents of spool breaks.

- Slip-on Flanges - Used to determine the applicability of the Slip-on Flange Setback Distance Rule.

- Reducing Slip-on Flanges - Used to determine the applicability of the Slip-on Flange Setback Distance Rule.

- Plate Flanges Plate Flange Setback Distance Rule - Used to determine the applicability of this rule.

- Reducing Plate Flanges Plate Flange Setback Distance Rule - Used to determine the applicability of this rule.

- Orifice Flanges - Automated flange selection.

- Blind Flanges - Automated flange selection.

- Reinforcing Pads - Verification of Branch Intersection rule.

- Hose Accessories Verification of the piping commodity part data – Used to determine whether a value is required for Water Weight.

⊟ NOTE The value of 'Accessories' for the Piping Component Class property is also used in the verification of the piping commodity part data to determine whether a value is required for Water Weight.

Catalog Parts Hierarchy

This sheet defines the Piping > Parts hierarchy in the Catalog task. The Piping Commodity Class Short Descriptions (column B) defines the first level of nodes under the Parts node. The Piping Commodity Sub Class Short Description (column D) defines the next level in the

hierarchy. The Piping Commodity Type Short Description (column F) defines the final level before the parts are listed.

Piping Point Usage

The **Piping Point Usage** select list (codelist) defines the piping point basis for objects in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Piping Spec Status

The **Piping Spec Status** select list (codelist) lists the different statuses for a piping materials class. Refer to the Piping Materials Class Data topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Piping Spec Version Management Option

The **Piping Spec Version Management Option** select list (codelist) defines the options for the versioning of piping specifications.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Piping Specification Notes Option

The **Piping Specification Notes Option** select list (codelist) defines the options that designate whether piping specification notes display as the numeric value or as the textual value.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Plane Of Flip

The **Plane Of Flip** select list (codelist) specifies that the rotation axis is parallel to depth.

This select list is used in the Catalog task. The list belongs to the REFDAT namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Plane of Turn

The **Plane of Turn** select list (codelist) defines the options for rotating HVAC turn components.

This select list is used in the HVAC task. The list belongs to the UDP namespace.

Plate Part Category

The **Plate Part Category** select list (codelist) defines the available categories for plate parts in the software.

This select list is used in the Structural Detailing task. The list belongs to the UDP namespace.

≣ NOTE This list populates the **Naming Category** box when you select **Standalone** in the **Type** box on the **Properties** dialog box for plate parts.

Pressure Rating

The **Pressure Rating** select list (codelist) defines the available pressure rating for bolted joints. The software ignores any alphabetic characters in the pressure rating when using the rating for comparison. For example, CL300, 300#, and 300 are equivalent.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

≣ NOTE When the Bulkload utility finds pressure rating and schedule/thickness values in the Piping reference data workbooks, the utility attempts to find the values in the **Short Description** column first and in the **Codelist Number** column second.

⊙ WARNING This is a hierarchical select list. In the Parent select list (Rating Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Property Page Behavior

When you view this select list on **Properties** dialog boxes, the software only displays the practices that have child values. For example, only the parent Rating Practices with child values (Pressure Ratings) display.

Upon migration, if a parent has been previously selected (and this parent has no children), the software shows the following behavior. The first time you display the **Properties** dialog box and click the parent field, that parent value is discarded. The software does not allow you to re-select this parent, unless child values are added in the catalog.

Profile Part Category

The **Profile Part Category** select list (codelist) defines the available categories for profile parts in the software.

This select list is used in the Structural Detailing task. The list belongs to the UDP namespace.

NOTE This list populates the **Naming Category** box when you select **Standalone** in the **Type** box on the **Properties** dialog box for stiffener profile parts.

ProfileEncasementType

The **Struct Insulation Encasement** select list (codelist) defines the insulation encasement types.

This select list is used by the Structure task and belongs to the User Defined Package name space.

NOTE You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. Custom (user added) select list numbers must be between 10,001 and 40,000.

Property Categories

Property Categories defines the categories for custom interfaces. This select list is used in the reference data for multiple tasks: Compartmentation, Planning, and Structural Manufacturing. The list belongs to the CORE namespace. You can define custom interfaces and user attributes on the **Custom Interfaces** sheets in the reference data workbooks.

NOTES

- Intergraph product codes are in the range 1000-9999: 1000-7999 for plant mode 8000-9999 for marine mode.

- User reference data codes start at 10,000.

- To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **PropertyCategories**.

Purchase Length Basis Option

The **Purchase Length Basis Option** select list (codelist) specifies the basis on which the purchase length in piping specifications is determined. The purchase length option applies to all piping materials classes within a piping specification.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

The following options are available in this select list:

By user

- The purchase length is based on the commodity option specified by the piping designer. In other words, all pipe stock lengths for the applicable pipe run are based on the same purchase length.

By system

- All purchase length options provided by the specification writer are to be used. In other words, multiple pipe stock lengths for the applicable pipe run are based on the purchase lengths of all commodity options specified for the pipe stock in the piping commodity filter.

⓿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Rear End Type

The **Rear End Type** select list (codelist) specifies the rear end types available for heat exchangers with variable head options.

This select list is used in the Equipment and Furnishings task. The list belongs to the REFDAT namespace.

Reference Plane View Directions

The **Reference Plane View Directions** select list (codelist) specifies reference plane view directions.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⓿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Reporting Requirement Basis

The **Reporting Requirement Basis** select list (codelist) defines the basis for reporting requirements: piping specification, rule, or piping designer.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Reporting Type

The **Reporting Type** select list (codelist) defines the available reporting types and requirements.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Reporting Requirement), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Requisition Responsibility

The **Requisition Responsibility** select list (codelist) defines the list of parties available for doing requisition work.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Requisition Type

The **Requisition Type** select list (codelist) defines the list of requisition types.

In piping projects, the requisition type value represents the basis for requisitioning the piping specialty as either custom- engineered or stock. Stock piping specialties represent those piping specialties, including steam traps, strainers, and some types of filters, that are purchased from a manufacturer's catalog, where no real engineering is required other than selecting the correct size, material, and so forth.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Respect Assembly Boundaries

The **Respect Assembly Boundaries** select list (codelist) is a Boolean (Yes/No) list that specifies whether or not the boundaries of assembly parents must be honored during WBS item creation. For example, if a pipe part belongs to a spool, all of the parts of the spool must be included in the same WBS item if this Boolean is True.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Revision History Notes Option

The **Revision History Notes Option** select list (codelist) defines the options for whether revision history notes are created, when revising data in piping specifications, piping catalog, or insulation specifications.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Ring Number

The **Ring Number** select list (codelist) defines the list of ring numbers for ring joint gaskets. Refer to the Gasket Part Data topic in the *Piping Reference Data Guide for* more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ WARNING This is a hierarchical select list. In the Parent select list (Ring Number Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Ring Profile Category

The **Ring Profile Category** select list (codelist) defines the available categories for ring profiles in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Rotation Offset Type

The **RotationOffsetType** select list (codelist) defines the offset used when rotating a grid plane from an elevation plane (Z).

This select list is used in the Grids task. The list belongs to the GRDSYS namespace.

Route Direction

The **Route Direction** select list (codelist) defines the available directions for routing in a zone.

The auto-routing functionality routes pipe through zones based on the property value that is defined for that zone.

This select list is used in the Space Management task. The list belongs to the REFDAT namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Route Layout

The **Route Layout** select list (codelist) defines options for the routing applications.

This select list is used in the Space Management task. The list belongs to the CMNSCH namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Route on Face

The **Route on Face** select list (codelist) defines options for routing from the faces of objects in the model.

This select list is used in the Space Management task. The list belongs to the CMNSCH namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Rpt Piping Commodity Basis

The **RptPipingCommodityBasis** select list (codelist) provides the means to report additional pipe length required for reportable part fabrication. It also specifies when:

- Reportable piping commodities are queried based on the dimensions **first size x second size** (or **header size x branch size**) for reducing fittings

- Reportable parts are queried based on the **Query based on second size** codelist value.

For example, if a reinforcing pad needs additional pipe length, then pipe stock is created as a reportable piping commodity of the reinforcing pad itself using the **Query based on second size** codelist value.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Rule Class Type

Rule Class Type defines the types of rule classes available in the software. This select list is used in the reference data for multiple tasks.

 TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **RuleClassType**.

Rule Type

Rule Type defines the available types of rules in the software. This select list is used in the reference data for multiple tasks.

 TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Rule Type**.

Schedule Thickness

The **Schedule Thickness** select list (codelist) defines the thickness schedules available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

 NOTE When the Bulkload utility finds pressure rating and schedule/thickness values in the Piping reference data workbooks, the utility attempts to find the values in the **Short Description** column first and in the **Codelist Number** column second.

 WARNING This is a hierarchical select list. In the Parent select list (Schedule Thickness Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Property Page Behavior

When you view this select list on **Properties** dialog boxes, the software only displays the practices that have child values. For example, only the parent Schedule Thickness Practices with child values (Schedule Thicknesses) display.

Upon migration, if a parent has been previously selected (and this parent has no children), the software shows the following behavior. The first time you display the **Properties** dialog box and click the parent field, that parent value is discarded. The software does not allow you to re-select this parent, unless child values are added in the catalog.

Selection Basis

The **Selection Basis** select list (codelist) defines the values that indicate whether the piping commodity is available for manual selection by the piping designer or for selection only as a result of a rule.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

The following examples show how this select list is used:

- For flanges, this select list provides an indication of whether the automated flange selection logic is applied. The value should be enabled for the default flange connected to fitting short code and the default flange connected to plain piping short code. Otherwise, the value should be disabled such that the flange selected by the piping designer overrides the default flange, as selected by the software. In other words, this select list provides the means for the piping designer to optionally (at the discretion of the specification writer) be able to select a flange that is not subject to the automated selection logic for flanges.

- For reinforcing pads, this select list provides an indication of whether the reinforcing pad thickness and the reinforcing pad width are to be specified by the software (system) or by the user.

- For reinforcing welds, this select list provides an indication of whether the reinforcing weld size is to be specified by the software (system) or by the user.

- For pipe bends, this select list provides an indication that the bend radius is determined from the piping commodity filter, and that the corresponding specification and catalog data are not required. The commodity code for the pipe bend is expected to be the commodity code of the plain piping from which the pipe bend is fabricated.

- For mitered elbows, this select list provides an indication that the number of miter cuts is determined from the piping commodity filter, and that the corresponding specification and catalog data are not required. The commodity code for the pipe bend is expected to be the commodity code of the plain piping from which the mitered elbow is fabricated.

Reinforcing Pads

Reinforcing pads are treated as piping commodities, where the commodity code is included in the piping specification. Reinforcing pads appear in the bill of material on the isometric drawing. Some users include the reinforcing pad thickness and width on the isometric drawing, while other users do not show this data in the material description on the isometric drawing. In the latter case, the reinforcing pad thickness and width are based on a standard that is included with the paper piping specification and, while the data from the standard is accurate, the reinforcing pad thickness and width are determined from the chart for fabrication, and not from the material description on the isometric drawing.

If the reinforcing pad is placed by the system, its reinforcing pad width and reinforcing pad thickness are computed. Any reinforcing pad that is placed as a result of the Branch Intersection rule should be considered as placed by the system. However, if the reinforcing pad is placed by the user, the piping designer must specify the pad width and thickness. If branch reinforcement calculations have been enabled for the piping specification, the reinforcing pad width and the reinforcing pad thickness, after subtracting the applicable mill tolerance as specified by the piping designer at placement time, must be verified to represent adequate reinforcement by means of the branch reinforcement calculations. This verification must consider the minimum fillet weld size between the header and the pad, and the minimum fillet weld size between the branch and the pad.

The acceptability of the reinforcing pad should be re-verified in any situation where the reinforcing pad is re-computed on the basis of any reference data changes or changes to engineering data in the model that affect the selection of the reference data for that reinforcing pad.

Reinforcing Welds

A reinforcing weld, which can be either a stub-on type or a stub-in type welded to the header pipe, is not a piping commodity that can be purchased. Typically, a reinforcing weld does not include a commodity code in the piping specification. Likewise, a reinforcing weld is typically not included in the bill-of-materials with the isometric drawing. A reinforcing weld should automatically be placed as a non- material take-off item, if enabled by a project-wide option.

If the reinforcing weld is placed by the system, its reinforcing weld size is computed. Any reinforcing weld that is placed as a result of the Branch Intersection rule should be considered as placed by the system. However, if the reinforcing weld is placed by the user, the piping designer must specify the weld size. If branch reinforcement calculations have been enabled for the piping specification, the reinforcing weld size, as specified by the piping designer at placement time, must be verified to represent adequate reinforcement by means of the branch reinforcement calculations.

⊕ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Selection Basis per PCF

The **SelectionBasisperPCF** select list (codelist) is used in specifying exceptions to the End Preparation Compatibility rule.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Shell Category

The **Shell Category** select list (codelist) defines the available categories for shells in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Ship Design Loading Condition Type

Ship Design Loading Condition Type specifies the loading condition types for compartments. This codelist is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **ShipDesignLoadingConditionType**.

Short Code Hierarchy Type

The **Short Code Hierarchy Type** select list (codelist) defines the applicable short codes for each class. The specification writer can designate which short codes are exposed to the piping designer under which configurations. Refer to the Short Code Hierarchy Rule topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task by the routing solver. The list belongs to the REFDAT namespace.

WARNING This is a hierarchical select list. In the Parent select list (Short Code Hierarchy Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Number	Description	Route Feature	When to use
Inline Filters			
5	Valves	Along Leg Feature	For valves
10	Flanges	Along Leg Feature	For flanges
15	Concentric Size Change Fittings	Intermediate End Feature Pair	For reducers, reducing flanges, and so forth.
20	Eccentric Size Change Fittings	Intermediate End Feature Pair	For eccentric reducers
25	Closing Fittings	End Feature	Components with only one port that are meant to close the run.

Number	Description	Route Feature	When to use
30	Elbolets	Intermediate End Feature	For elbolets. Currently, Elbolets are modeled as single size along leg features. In the future, this could change to a branch-feature to represent the true two-size nature.
35	Other Inline Fittings	Along Leg Feature	All other inline fittings including those that have offset. Examples include 2-port steam traps with offset, bosses, orifice plates, and so forth. This can also include 3-port components that are not rule driven branches such as 3-way valves.
Change of Direction Fittings			
40	Elbows	Turn Feature	Elbows, angle-valves, and so forth.
45	Pipe Bends	Turn Feature	Pipe bends
50	Miters	Turn Feature	Miters
Branches			
55	Tee Type Branches	Along Leg Feature-Branch Parent	Branch components that are inserted on the header run and that are rule-driven (short-code appears in branch rule).
60	Olet Type Branches	Branch Feature	Olet type branches that penetrate the header without splitting it. Examples include olets, bosses, r-pads.
65	Lateral Type Branches	Along Leg Feature-Branch Parent	Branch components that are inserted on the header run and that are rule-driven (short-code appears in branch rule)
70	Lateralolet Type Branches	Branch Feature	Same as olet type branches except the angle need not be 90˚.
75	Cross Branches	Along Leg Feature	Cross branches
80	Other Branches	Along Leg Feature	
Miscellaneous Fittings			

Number	Description	Route Feature	When to use
85	Miscellaneous	Along Leg Feature-End Leg	Components with more than three ports where it is required that routing be possible from the ports. Also, components with three-ports where primary ports are not inline and/or the third port is not in the same plane as the primary ports. Essentially, this option is a catch-all for components that do not fall into other categories.
90	Returns	Along Leg Feature-End Leg	For 180° returns
110	Surface Mounted Components	Along Leg Feature	For Surface Mounted components
Plain Piping or Tubing			
95	Pipes	Straight Feature and/or Turn Feature based on topology	For pipes
100	Tubes	Straight Feature and/or Turn Feature based on topology	For tubes
105	Hoses	Straight Feature and/or Turn Feature based on topology	For hoses

If you are not sure which select list number to use for your non-standard component, refer to the following table:

For a component having…	The Short Code Hierarchy type in the specification rule should be...	Resulting Route Feature Type
One port	Inline Fittings/Closing Fittings	End feature
Two ports with a change in direction	Change Of Direction Fittings	Turn feature

For a component having…	The Short Code Hierarchy type in the specification rule should be...	Resulting Route Feature Type
Two inline ports having different NPD (with and without offset)	Inline Fittings/Concentric Size Change Fittings Inline Fittings/Eccentric Size Change Fittings	Intermediate end feature.
Two inline ports with same NPD (with and without offset)	Inline Fittings/Valves Inline Fittings/Flanges Inline Fittings/Other Inline Fittings	Along-leg feature.
Component having three ports with two inline ports and one offline port and all ports intersect at symbol origin.	Branches/Tee Type Branches	Along-leg branch parent feature.
Component having three or more ports with at least two inline ports. If a three-port component, then all ports do not intersect at symbol origin.	Inline Fittings/Other Inline Fittings Branches/Other Branches	Along-leg feature.
Component having more than two ports with only one inline port	Miscellaneous Fittings/Miscellaneous	End feature.
Components having four ports where two are inline and all ports intersect at symbol origin	Branches/Cross Branches	Along-leg feature.

Signal Type

The **Signal Type** select list (codelist) specifies the applicable values for the cable usage property, which is used for tray fill calculations.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Size Reduction Preference

The **Size Reduction Preference** select list (codelist) defines the size reductions in the model. For example, a reduction from 24 in. to 6 in. would require two reducers: a 24 in. x 12 in. reducer and a 12 in. x 6 in. reducer.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Size Reduction Type

The **Size Reduction Type** select list (codelist) specifies the types of size reductions (either concentric or eccentric) available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Boundary Reference

The **Slab Boundary Reference** select list (codelist) specifies slab boundary references for members in the model. Refer to the Slab General Type topic in the *Structure Reference Data Guide* for more information on how this select list is used.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Composition

The **Slab Composition** select list (codelist) specifies the options for composition of slabs.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Slab Continuity

The **Slab Continuity** select list (codelist) specifies the continuity types for slabs in the model. Refer to the *Structure Reference Data Guide* for more information on how this select list is used when defining layers and slabs.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Corner Type

The **Slab Corner Type** select list (codelist) defines the corner types for slabs in the model.

This select list is used in the reference data for the Structure task, when extending the possible value and behavior of the slab assembly connections. The list belongs to the REFDAT namespace.

⊘ WARNING You should not change the pre-existing numeric values in this select list. You can add new values, but you must customize a delivered Visual Basic program in the software.

Slab Cross Section Symbol

The **Slab Cross Section Symbol** select list (codelist) defines the cross section symbols for slabs in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Slab Direction Reference

The **Slab Direction Reference** select list (codelist) defines the directions for slabs in the model. Refer to the Slab General Type topic in the *Structure Reference Data Guide* for more information on how this select list is used.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Face Position

The **Slab Face Position** select list (codelist) defines the face positions on slabs in the model. Refer to the Slab General Type topic in the *Structure Reference Data Guide* for more information on how this select list is used. The face position of a slab affects the location of the supports placed in the Hangers and Supports task.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Fastener Type

The **Slab Fastener Type** select list (codelist) specifies the fastener types for slabs in the model. Refer to the Slab General Type topic in the Stru*cture Reference Data Guide* for more information on how this select list is used.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Slab Layer Role

The **Slab Layer Role** select list (codelist) specifies the layer roles for slabs in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Manufacturing Process

The **Slab Manufacturing Process** select list (codelist) specifies the manufacturing processes for slabs in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Nosing Material

The **Slab Nosing Material** select list (codelist) specifies the nosing materials for slabs in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Slab Nosing Type

The **Slab Nosing Type** select list (codelist) specifies the nosing types for slabs in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Priority

The **Slab Priority** select list (codelist) specifies the priorities for slabs in the model. Refer to the Slab General Type topic in the *Structure Reference Data Guide* for more information on how this select list is used.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Slab Reference Direction

The **Slab Reference Direction** select list (codelist) specifies the reference directions for slabs in the model.

This select list is used in the Structure task when extending the possible value and behavior of slab assembly connections. The list belongs to the REFDAT namespace.

⊘ WARNING You should not change the pre-existing numeric values in this select list. You can add new values, but you must customize a delivered Visual Basic program in the software.

SmartMarine 3D Data Integrity Msgs

SmartMarine 3D Data Integrity Msgs defines the database integrity messages for Ship Structure and Structural Detailing in the software.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SmartMarine 3DDataIntegrityMsgs**.

SmartMarine 3D Msgs

SmartMarine 3D Msgs defines the messages for the **To Do List** in the software.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy, and select **SmartMarine 3DMsgs**.

Space Access Type

Space Access Type specifies the types of access for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceAccessType**.

Space Adjacency Contact Type

Space Adjacency Contact Type specifies the adjacency contact types for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceAdjacencyContactType**.

Space Adjacency Geometry Type

Space Adjacency Geometry Type the adjacency geometry types for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceAdjacencyGeometryType**.

Space Arrangement Orientation

Space Arrangement Orientation specifies arrangement options for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceArrangementOrientation**.

Space Arrangement Type

Space Arrangement Type specifies the types of arrangements for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceArrangementType**.

Space Item Purpose

Space Item Purpose specifies lists the item purposes for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceItemPurpose**.

Space Physical Orientation Type

Space Physical Orientation Type specifies the types of physical orientation for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpacePhysicalOrientationType**.

Space Positional Relationship Type

Space Positional Relationship Type specifies the types of positional relationships for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpacePositionalRelationshipType**.

Space Product Structure Type

Space Product Structure Type specifies the type of structure for space objects. This select list (codelist) is used in the reference data for the Compartmentation task. This select list belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **SpaceProductStructureType**.

Spectacle Position

The **Spectacle Position** select list (codelist) specifies the available positions for spectacle blinds in the model.

This select list is used in the Piping task. The list belongs to the UDP namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Spool Break by Control Point

The **Spool Break by Control Point** select list (codelist) specifies the different methods of spooling at control points.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Spool Include Welded Parts

The **Spool Include Welded Parts** select list (codelist) defines the available options for spooling. In the past, the spooling command only added the portion of a pipe support that was actually connected to the pipe via a weld. The Route Spooling Command adds a third option that allows not only the welded parts, but the entire support to be included as a child of the spool object. This behavior is optional and can be set by modifying the **Include Items Welded to Pipe in Spools** attribute on the **Options** tab in the **Spool Generation** dialog box.

NOTE When using the All Shop Parts option, only support components that have a Fabrication Requirement of "By fabricator", a Fabrication Type of "Shop fabricated" and a Fabrication Responsibility of "By Piping" will be included in the spool.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

IMPORTANT You can change the textual values in this select list, but you must not change the numeric values or the meaning of the values; and you must not add or delete values.

Spool Sequencing Type

The **Spool Sequencing Type** select list (codelist) specifies the different ways of sequencing spools.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Spooling Basis

The **Spooling Basis** select list (codelist) specifies the types of spooling, either by pipeline or block. Plant design users typically spool by pipeline, and ship design users typically spool by block. You can also spool by WBS (Work Breakdown Structure) Item. This functionality allows WBS Items to be used to group pipe parts. The collections of pipe parts are used during the creation of isometric drawings.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Steamout Requirement

The **Steamout Requirement** select list (codelist) specifies the steam-out requirements for use in the model.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Stress Relief

The **Stress Relief** select list (codelist) specifies the values representing the industry practices for stress relief. Refer to the Piping Materials Class Data topic in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Stress Relief Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Stress Relief Requirement

The **Stress Relief Requirement** select list (codelist) lists options for whether stress relief is required.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

StructAlignOrient

The **StructAlignOrient** select list (codelist) defines the values for whether or not the align frame connection is oriented or not.

This select list is used in the Structure task. This list belongs to the REFDAT namespace.

StructAlignSideJustification

The **StructAlignSideJustification** select list (codelist) defines the values for which an align connection can be lined up with.

This select list is used in the Structure task. This list belongs to the REFDAT namespace.

StructAlignTo

The StructAlignTo select list (codelist) specifies the values for what part of the supporting member an align connection connects to.

This select list is used in the Structure task. This list belongs to the REFDAT namespace.

StructAlignWith

The **StructAlignWith** select list (codelist) defines the values for what an align connection can align with.

This select list is used in the Structure task. This list belongs to the REFDAT namespace.

Struct 2L Back to Back Rule

The **Struct 2L Back to Back Rule** select list (codelist) specifies the back-to-back rules for 2L members in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Struct AC Left Right Both

The **Struct AC Left Right Both** select list (codelist) specifies the available axis connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct AC Pad Type

The **Struct AC Pad Type** select list (codelist) specifies the pad types for assembly connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct AC Sizing Rule

The **Struct AC Sizing Rule** select list (codelist) specifies the sizing rules for axis connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct AC Splice Types

The **Struct AC Splice Types** select list (codelist) specifies the available splice types for assembly connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct AC To Do Messages

The **Struct AC To Do Messages** select list (codelist) specifies the To Do List messages for assembly connections in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Alignment

The **Struct Alignment** select list (codelist) specifies the alignment options for members in the model.

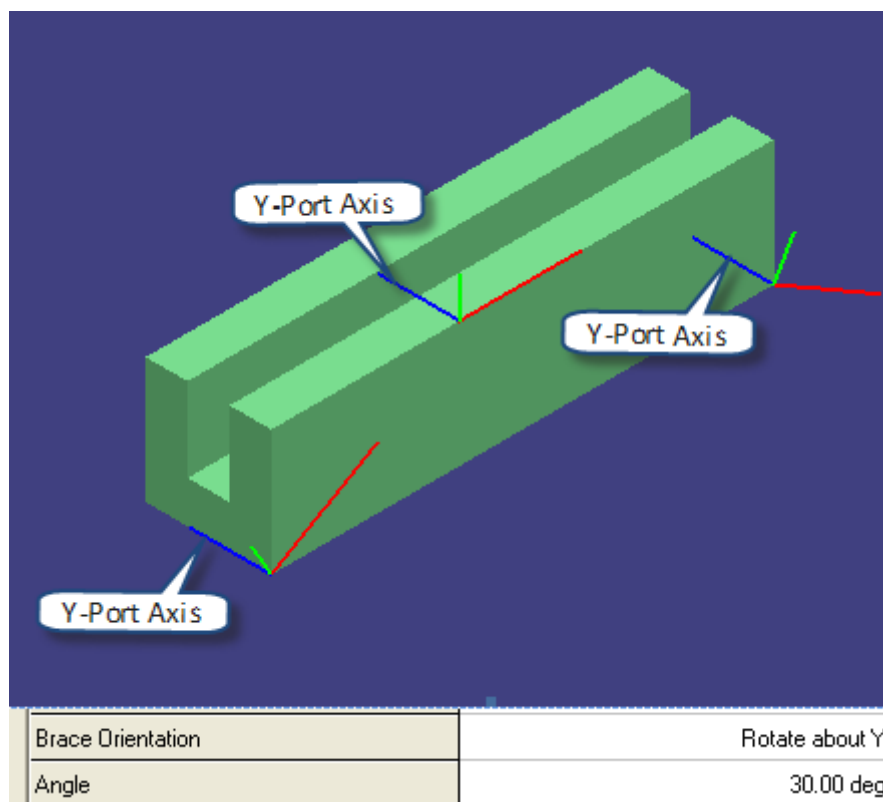This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Boundary Conditions

The **Struct Boundary Conditions** select list (codelist) specifies the boundary conditions for structural analysis.

This select list is used in the Structural Analysis task. The list belongs to the CMNSCH namespace.

▤ NOTE Valid member end releases numbers are between 0 and 64. In the workbook, you can comment out those you do not want to appear in the software. You can name and uncomment those you want to appear in the software.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Can Diameter Rule

The **StructCanDiameterRule** select list (codelist) defines the diameter of the cans used in trusses and onshore facilities.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

Struct Can Length Compute Method

The **StructCanLengthComputeMethod** select list (codelist) determines the hull factor and length, and the centerline factor and length.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

Struct Can Rule To Do Messages

The **StructCanRuleToDoMessages** select list (codelist) select list (codelist) specifies the To Do List messages for Structure cans in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the CMNSCH namespace.

Struct Can Type

The **StructCanType** select list (codelist) defines the can type: inline, stub end, or end.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

Struct Cone Length Compute Method

The **StructConeLengthComputeMethod** select list (codelist) defines the slope, angle, and length of the can.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

Struct Compute Rule

The **Struct Compute Rule** select list (codelist) determines whether the designed member section properties is computed by system or by user.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Continuity

The **Struct Continuity** select list (codelist) specifies the continuity options for members in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Coord Sys Reference

The **Struct Coord Sys Reference** select list (codelist) specifies the coordinate systems used for structural operations in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Struct Custom Plate Part Type

The **Struct Custom Plate Part Type** select list (codelist) specifies the plate types available in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Struct Custom Plate Part Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Struct End Releases

The **Struct End Releases** select list (codelist) specifies the end release options for members in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

📄 NOTE Valid member end releases numbers are between 1 and 63. In the workbook, you can comment out those you do not want to appear in the software. You can name and uncomment those you want to appear in the software.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Eqp To Do Messages

The **Struct Eqp To Do Messages** select list (codelist) specifies the To Do List messages for equipment foundations in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct FC Chevron WPO

The **Struct FC Chevron WPO** select list (codelist) specifies the work point offsets for frame connection chevrons in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct FC End Controlling

The **Struct FC End Controlling** select list (codelist) specifies the end controlling values for frame connections.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct FC Offset Along

The **Struct FC Offset Along** select list (codelist) lists the offset along references for frame connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct FC Offset Direction

The **Struct FC Offset Direction** select list (codelist) specifies the offset directions for frame connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct FC Position Ref

The **Struct Frm Conn Position Ref** select list (codelist) specifies the frame connection positions for members in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ **WARNING** You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct FC Supported Edge

The **Struct FC Supported Edge** select list (codelist) specifies the supported edges for frame connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct FC Supporting CPs

The **Struct FC Supporting CPs** select list (codelist) specifies the supporting cardinal points for frame connections in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can change the textual values in this select list, but you must not change the numeric values or the meaning of the values; and you must not add or delete values.

Struct FC Supporting Side

The **Struct FC Supporting Side** select list (codelist) specifies the supporting sides for frame connections in the model.

This select list is used in the Structure task. The list belongs to the UDP namespace.

Struct FC To Do Messages

The **Struct FC To Do Messages** select list (codelist) specifies the To Do List messages for frame connections in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Feature Radius Type

The **Struct Feature Radius Type** select list (codelist) specifies the radius types for structure features.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You should not change the pre-existing numeric values in this select list. You can add new values, but you must customize a delivered Visual Basic program in the software.

Struct Feature To Do Messages

The **Struct Feature To Do Messages** select list (codelist) specifies the To Do List messages for structural features in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct FireProofing To Do Messages

The **Struct FireProofing** To Do Messages select list (codelist) specifies the To Do List messages for fireproofing features in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Footing Comp Sizing Rule

The **Struct Footing Comp Sizing Rule** select list (codelist) specifies the composite sizing rules for footings in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Struct Footing To Do Messages

The **Struct Footing To Do Messages** select list (codelist) specifies the To Do List messages for structural footings in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Insulation Encasement

The **ProfileEncasementType** select list (codelist) (on the StructInsulationEncasement worksheet) defines the optional attributes for structure insulation.

This select list is used by the Structure task and belongs to the REFDAT name space.

Struct Insulation Purpose

The **Struct Insulation Purpose** select list (codelist) defines the different purposes for the insulation.

This select list is used by the Structure task and belongs to the REFDAT name space.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Member End Selection Rule

The **Struct Member End Selection Rule** select list (codelist) specifies the end selection rules for members in the model. The rules determine from which end of the supporting member the software makes its measurements.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Member Position Rule

The **Struct Member Position Rule** select list (codelist) specifies the position rules for members in the model. The rules determine the position of the end of the supported member along the supporting member.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Plate Part To Do Messages

The **Struct Plate Part To Do Messages** select list (codelist) specifies the To Do List messages for plate parts in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Prismatic Footing Shapes

The **Struct Prismatic Footing Shapes** select list (codelist) specifies the shapes for prismatic footings in the model.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

Struct SC To Do Messages

The **Struct SC To Do Messages** select list (codelist) specifies the To Do List messages for split connections in the model.

This select list is used in the Structure task. The list is delivered in StructCustomCodeList.xls and belongs to the UDP namespace.

Struct Wall Boundary Size

The **Struct Wall Boundary Size** select list (codelist) specifies **Finite** or **Infinite** boundary size for wall structure features. This select list is used in the Structure task. The list belongs to the UDP namespace.

⓿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Wall Boundary Type

The **Struct Wall Boundary Type** select list (codelist) specifies **Above**, **Below**, **Start/End** and **Contact** boundaries for wall structure features. This select list is used in the Structure task. The list belongs to the UDP namespace.

⓿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Wall Connection Type

The **Struct Wall Connection Type** select list (codelist) specifies available connections (**Undefined**, **Aligned**, **Along** and **Corner**) for wall structure features. This select list is used in the Structure task. The list belongs to the UDP namespace.

⓿ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Struct Wall Reference Attribute

The **Struct Wall Reference Attribute** select list (codelist) specifies **Center**, **Far** or **Near** reference points or attributes for wall structure features. This select list is used in the Structure task. The list belongs to the UDP namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

StructInsulationSetbackReference

The **Struct Insulation Setback Reference** select list (codelist) defines the different starting points from which fireproofing setbacks are measured. Insulation is frequently placed so that the member is exposed at the ends to permit connections to be placed. This requires the insulation to be trimmed from the end, or *setback*. The codelist values allow you to choose which geometry of the memberPart to use as the datum for the setback distance. All four choices are available for both ends. An example would be for a column where both references can be set to the bottom of the column axis. For a beam, the start reference is set to the beam part start and the end reference will use the part end.

This select list is used by the Structure task and belongs to the UDP name space.

NOTE You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. Custom (user added) select list numbers must be between 10,001 and 40,000.

Struct Load Case Source

The **Structural Load Case Source** select list (codelist) specifies the different sources of load in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

WARNING This is a hierarchical select list. In the Parent select list (Struct Load Case Source Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Structural Member Priority

The **Structural Member Priority** select list (codelist) specifies the priorities for members in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Structural Member Type

The **Structural Member Type** select list (codelist) specifies the types for members in the model.

This select list is used in the Structure task. The list belongs to the CMNSCH namespace.

⊙ WARNING This is a hierarchical select list. In the Parent select list (Structural Member Type Category), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Structural WPO Intersection Index

The **Structural WPO Intersection Index** select list (codelist) specifies the available work point offset (WPO) intersections.

This select list is used in the Structure task. The list belongs to the REFDAT namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Supplementary Nut Requirement

The **Supplementary Nut Requirement** select list (codelist) defines the options that indicate whether a second, supplementary nut is required for each machine bolt or each end of each stud bolt.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊙ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Supplementary Washer Requirement

The **Supplementary Washer Requirement** select list (codelist) defines the options that indicate whether a second, supplementary washer is required for each machine bolt or each end of each stud bolt.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Supply Responsibility

The **Supply Responsibility** select list (codelist) specifies the parties available for supplying materials.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Surface Preparation

The **Surface Preparation** select list (codelist) specifies the different surface preparations for piping commodities.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Tap End Stud Bolt Length Round Off Option

The **Tap End Stud Bolt Length Round Off Option** select list (codelist) provides either a user-defined list or a list of preferred tap end stud bolt lengths. This select list is used in the Piping task. The list belongs to the REFDATA namespace.

⬤ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Tech Delivery Conditions

The TechDeliveryConditions select list (codelist) provides the ability to specify the technical delivery conditions for piping commodities, stock piping specialties and stock instruments. This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⬤ WARNING This is a hierarchical select list. In the Parent select list (Tech Delivery Conditions Pract), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Testing Responsibility

The **Testing Responsibility** select list (codelist) specifies the parties that are responsible for testing.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

Testing Type

The **Testing Type** select list (codelist) specifies the available testing requirements and types.

This select list is used in the Piping task. The list belongs to the CMNSCH namespace.

WARNING This is a hierarchical select list. In the Parent select list (Testing Requirements), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Tightness

The **Tightness** select list (codelist) specifies the types of tightness for objects in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Transverse Beam Category

The **Transverse Beam Category** select list (codelist) defines the available categories for transverse beams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Transverse Bulkhead Category

The **Transverse Bulkhead Category** select list (codelist) defines the available categories for bulkheads in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Transverse Profile Category

The **Transverse Profile Category** select list (codelist) defines the available categories for transverse profiles in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Transverse Seam Category

The **Transverse Seam Category** select list (codelist) defines the available categories for transverse seams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Transverse Tube Category

The **Transverse Tube Category** select list (codelist) defines the available categories for transverse tubes in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Tray Specification Type

The **Tray Specification Type** select list (codelist) defines the type of Tray Specification.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Type

The **Type** select list (codelist) specifies the types of foundation ports in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Undefined Service Limits Rule Option

The **Undefined Service Limits Rule Option** select list (codelist) specifies the options for temperature/pressure service limits.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Utility BOM Units

The **Utility BOM Units** select list (codelist) is used by the Utility_Generic_C part to set the units (Imperial or Metric) used in the Bill of Materials report for a part. The list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

Utility Brace Orient

The **Utility Brace Orient** select list (codelist) determines which axis a brace port should be rotated about. This codelist works with the **Angle** property of the **Utility_GenericBrace Part**. For example, in the figure below, the **Angle** attribute is set to 30 degrees, and the **Brace Orientation** attribute is set to **Rotate about Y**, the y-port axis is the blue axis.

Brace Orientation	Rotate about Y
Angle	30.00 deg

The list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

Utility_Holes

Utility_Holes lists the options for the number of holes. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Utility_Holes**.

Utility_Nuts

Utility_Nuts lists the options for the number of nuts. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Utility_Nuts**.

Utility_PlateThickness

Utility_PlateThickness lists the options for the thickness of plates. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Utility_PlateThickness**.

Utility_Tabs

Utility_Tabs lists the options for the number of tabs. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Utility_Tabs**.

Utility_YesNo

Utility_YesNo lists the options for whether or not to designate the part for the bill of materials. This select list (codelist) is used in the reference data for the Hangers and Supports task. This select list is delivered in HS_Utility_Codelist.xls and belongs to the UDP namespace.

TIP To view the select list values delivered with the software, open the **Select List** node in the Catalog hierarchy and select **Utility_YesNo**.

Valve Flow Pattern

The **Valve Flow Pattern** select list (codelist) provides the options of the flow pattern for a valve, which can include T, Y, 2-way, 3-way and 5-way patterns, to name a few. The select list is used in the reference data for the piping task.

This select list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Valve Model Number

The **Valve Model Number** select list (codelist) specifies the manufacturers and model numbers for valves.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING This is a hierarchical select list. In the Parent select list (Valve Manufacturer Ind Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Valve Operator Geometric Industry Standard

The **Valve Operator Geometric Industry Standard** select list (codelist) specifies the industry standards for valve operators.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING This is a hierarchical select list. In the Parent select list (Valve Operator Geometric Ind Pract), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Valve Operator Part Data Basis

The **Valve Operator Part Data Basis** select list (codelist). The select list is used in the reference data for the piping task.

This select list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Valve Operator Type

The **Valve Operator Type** select list (codelist) specifies the valve operators available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Valve Operator Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Valve Port Option

The **Valve Port Option** select list (codelist) specifies the valve port types, such as a conventional port, a regular port or a reduced port, available for use in the model.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Valve Trim

The **Valve Trim** select list (codelist) specifies the standards for valve trim, which includes valve working parts and materials.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⚠ WARNING This is a hierarchical select list. In the Parent select list (Valve Trim Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Vendor

The **Vendor** select list (codelist) specifies the vendors that supply piping commodities. Typically, values for the vendor property are imported from a material control system, if required.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

📝 NOTE The meaning of vendor differs from the meaning of manufacturer in this usage. A vendor supplies the commodities, while a manufacturer produces the commodities.

Vertical Beam Category

The **Vertical Beam Category** select list (codelist) defines the available categories for vertical beams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Vertical Profile Category

The **Vertical Profile Category** select list (codelist) defines the available categories for vertical profiles in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Vertical Seam Category

The **Vertical Seam Category** select list (codelist) defines the available categories for vertical seams in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Vertical Tube Category

The **Vertical Tube Category** select list (codelist) defines the available categories for vertical tubes in the software.

This select list is used in the Molded Forms task. The list belongs to the UDP namespace.

Vessel Head Type

The **Vessel Head Type** select list (codelist) specifies the various head types for horizontal and vertical tanks.

This select list is used in the Equipment and Furnishings task. The list belongs to the REFDAT namespace.

Voltage Grade

The **Voltage Grade** select list (codelist) specifies the grades for cable voltages. Voltage grade can be seen as an electrical service level. The different grades can be assigned to cable runs and cableway and cable tray runs and can be used for fill calculations, naming rules, or labeling.

This select list is used in the Electrical task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Washer Creation Option

The **Washer Creation Option** select list (codelist) defines the option of whether washers are created at a bolted joint. The specification writer can disable this option when washers are not tracked for material management purposes.

Even if this option is disabled, the specification writer can still use the washer thickness for the bolt length calculation if the washer selection filter and accompanying washer part data are defined in the catalog.

In other words, the washer selection filter, and the accompanying washer part data, may be used for bolt length calculations, even when this option has been disabled. In this situation, the washer thickness, as well as the bolt extension, will be included in the bolt length calculation, although the bolt extension will be expected to not consider the washer thickness.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Washer Option

The **Washer Option** select list (codelist) specifies the types of washers available in the model.

A default washer option represents the washer that should be used when the piping designer has not explicitly selected one. The washer option, if applicable, is selected by the piping designer at a bolted joint.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

Washer Type

The **Washer Type** select list (codelist) specifies the types of washers that are available.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

WBS Auto Grouping Rule Type

The **WBS Auto Grouping Rule Type** select list (codelist) defines the different ways to group items during automated WBS creation.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

WBS Item Assignment

The **WBS Assignment** select list (codelist) defines the different ways to assign items during automated WBS creation - by system or by assembly.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

WBS Item Purpose

The **WBS Item Purpose** select list (codelist) specifies the different purposes for items in the work breakdown structure (WBS).

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

NOTES
- Intergraph product codes are in the range 1000-9999: 1000-7999 for plant mode and 8000-9999 for marine mode.
- User reference data codes start at 10,000.

WBS Project Purpose

The **WBS Project Purpose** select list (codelist) specifies the project purposes for the work breakdown structure (WBS).

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

NOTES
- Intergraph system codes are in the range 1-999.
- Intergraph product codes are in the range 1000-9999: 1000-7999 for plant mode and 8000-9999 for marine mode.

WBS Pull In Associated Items

The **WBS Pull In Associated Items** select list (codelist) specifies whether or not the software includes associated items during WBS item creation.

This select list is used in multiple tasks. The list belongs to the CMNSCH namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

Weld Type

The **Weld Type** select list (codelist) specifies the available weld types for welded joints in the model. Refer to the Weld Model Representation Rule, Weld Type Rule, and the Weld Clearance Rule topics in the *Piping Reference Data Guide* for more information on how this select list is used.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Weld Class), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Welding Procedure Specification

The **Welding Procedure Specification** select list (codelist) defines the standards for weld sizes in different countries.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING This is a hierarchical select list. In the Parent select list (Welding Procedure Practice), you can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items in the parent list.

Welding Requirement

The **Welding Requirement** select list (codelist) defines the welding requirements for welds on piping commodities, if welded ends apply.

This select list is used in the Piping task. The list belongs to the REFDAT namespace.

⊘ WARNING You can edit the delivered text of the short or long descriptions as long as you do not change the meaning. Do not change the numeric values of the delivered select list items. You cannot add or delete select list items.

The following options are available:

▪ Each welded end requires a reportable weld. This value is the default for any piping commodity with one or more welded ends.

- The face of the flange requires an additional weld. This situation can occur for a slip-on flange.

- The face of the flange can have an optional, additional weld. This situation can occur for a plate flange, where the additional weld is based on the plate flange thickness.

- Each welded end requires a reportable weld. However, the weld at the second piping point is determined on the basis of the Weld Type Exception option rather than the Weld Type Rule. This situation occurs for fittings (for example, sleeves), where the weld type always differs between the two ends of the fitting.

- None of the ends requires welding. This value is the default for any piping commodity without any welded ends.

APPENDIX G
Appendix: Keyboard Shortcuts

Keyboard navigation with minimal use of the mouse is available in Catalog by using these keyboard shortcuts.

Key Stroke	Tree View	Grid View	Branch Table	Select Lists	Interfaces
Enter	Expands/Collapses the active node	Moves focus right one cell.	Moves focus right one cell. Saves selected value in drop-down list.	Nothing	Moves focus right one cell.
Tab	Moves focus to Grid View	Moves focus right one cell. If at row end, moves focus to Permission Group box.	Moves focus right one cell. If at row end, moves focus to the cell below. If at very last cell, moves focus to Permission Group box.	Moves focus to Permission Group Box.	Moves focus right one cell. If at row end, moves focus to Permission Group box.
Shift+Tab	Nothing	Moves focus left one cell. If at row start, moves focus to Tree View.	Moves focus left one cell. If a row start, moves focus to cell above. If at top cell, moves focus to the Tree View.	Nothing	Moves focus left one cell. If at row start, moves focus to Tree View.
Right Arrow	Expands active node if expandable. Right arrow again moves to first child node. Right arrow moves down to next node if node is not expandable.	Moves focus right one cell.	Moves focus right one cell.	Moves focus right one cell.	Moves focus right one cell.
Left Arrow	Collapses active node if expanded. Moves to parent node if already collapsed. Nothing if node does not expand or collapse.	Moves focus left one cell.	Moves focus left one cell.	Moves focus left one cell.	Moves focus left one cell.

Key Stroke	Tree View	Grid View	Branch Table	Select Lists	Interfaces
Up Arrow	Move up to next visible node in tree.	If cell is drop-down, scrolls up through drop-down entries. If cell is not a drop-down, moves focus up one cell.	Scrolls up through drop- down entries.	Moves focus up one cell.	Moves focus up one cell.
Down Arrow	Move down to the next visible node in tree.	If cell is drop-down, scrolls down through drop-down entries. If cell is not a drop-down, moves focus down one cell.	Scrolls down through drop- down entries.	Moves focus down one cell.	Moves focus down one cell.
CTRL+Right Arrow	Scrolls the horizontal scroll bar right.	Moves focus right one cell.	Moves focus right one cell.	Moves focus right one cell.	Moves focus right one cell.
CTRL+Left Arrow	Scrolls the horizontal scroll bar left.	Moves focus left one cell.	Moves focus left one cell.	Moves focus left one cell.	Moves focus left one cell.
CTRL+Up Arrow	Scrolls the vertical scroll bar up.	Moves focus up one cell.	Moves focus up one cell.	Moves focus to first row.	Moves focus up one cell.
CTRL+Down Arrow	Scrolls the vertical scroll bar down.	Moves focus down one cell	Moves focus down one cell.	Moves focus to the last row.	Moves focus down one cell.
Insert	Nothing	Inserts a new row and puts focus on first cell.	Nothing	Inserts a new row and puts focus on first cell.	Inserts a new row and puts focus on first cell.

Appendix: Industry Commodity Code

This appendix contains information about the automated generation of the Industry Commodity Code.

The following describes the format of the industry commodity based on the following types of commodity codes:

Miscellaneous Fittings
Flanges
Valves
Pipe Stock and Nipples
Tubing and Hose
Gaskets
Stud bolts, Machine Bolts, Cap Screws, and Jack Screws
Nuts
Washers
Miscellaneous Parts
Stock Piping Specialties
Stock Instruments
Off-line Instruments

Miscellaneous Fittings

This category includes flanged fittings, welded fittings, socket fittings, socket welded fittings, threaded fittings, tubing fittings, underground fittings, fire and safety components, and all other miscellaneous fittings.

Miscellaneous fittings are determined by the Piping Component Class property having a value equal to the numeric equivalent of 'End fittings', 'Direction change fittings', 'Branch fittings', or 'Fire and safety fittings' or by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Blinds', 'Stub ends', 'Coupling and connectors', 'Adapters', 'Unions', 'In-line spacers', 'Orifice spacers', 'Tapered spacers', 'Concentric diameter change', or 'Eccentric diameter change'.

1-3 Piping Component Type (first character is 'M')
4-5 Pressure Rating
6-7 End Preparation
8-9 Surface Preparation or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Miscellaneous Fitting Requisition Classification
18-19 Industry Practice

If the miscellaneous fitting is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Surface Preparation property is used.

Flanges

Flanges are determined by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Flanges', 'Slip-on flanges', 'Plate flanges', 'Lap joint flanges', 'Reducing flanges', 'Slip-on reducing flanges', 'Plate reducing flanges', 'Expander flanges', or 'Orifice flanges'.

1-3 Piping Component Type (first character is 'F')
4-5 Pressure Rating
6-7 End Preparation
8-9 Flange Face Surface or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Flange Requisition Classification
18-19 Industry Practice

If the flange is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Flange Face Surface Finish property is used.

Valves

Valves are determined by the Piping Component Class property having a value equal to the numeric equivalent of 'Valves'.

1-3 Piping Component Type (first character is 'V')
4-5 Pressure Rating
6-7 End Preparation
8-9 Valve Trim Material
10-12 Valve Manufacturer and Model Number or Geometric Industry Standard
13-15 Materials Industry Standard and Grade
16-17 Valve Requisition Classification
18-19 Lining Material
20-21 Industry Practice

If the valve has a model number, that is, the value of the Valve Manufacturer and Model Number property is not equal to the numeric equivalent of 'Undefined', then the Valve Manufacturer and Model Number property is used to form the 10th, 11th, and 12th characters of the industry commodity code. Otherwise, the Geometric Industry Standard property is used.

Pipe Stock and Nipples

Pipe Stock and Nipples are determined by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Piping, variable length', 'Piping, fixed length', 'Distance pieces', or 'Nipples'.

1-3 Piping Component Type (first character is 'P')
4-5 Pressure Rating
6-7 End Preparation
8-9 Surface Preparation or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Manufacturing Method
18-19 Nipple Length or Purchase Length
20-21 Industry Practice

If the pipe stock is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Surface Preparation property is used.

Tubing and Hose

Tubing and Hose is determined by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Tubing' or 'Hose'.

1-3 Piping Component Type (first character is 'T')
4-5 Pressure Rating
6-7 End Preparation
8-9 Surface Preparation or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Tubing and Hose Requisition Classification
18-19 Industry Practice

If the tubing is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Surface Preparation property is used.

Gaskets

Gaskets are determined on the basis of existence in the gasket part data.

1-2 Gasket Type (first character is 'G')
3-4 Pressure Rating
5-6 Gasket Thickness
7-9 Gasket Manufacturer and Style Number or Gasket Industry Standard
10-12 Materials Industry Standard and Grade
13 Flange Facing
14-15 Industry Practice

If the gasket has a style number, that is, the value of the Gasket Style Number property is not equal to the numeric equivalent of 'Undefined', then the Gasket Manufacturer and Style Number properties is used to form the 7th, 8th, and 9th characters of the industry commodity code. Otherwise, the Gasket Industry Standard property is used.

Stud Bolts, Machine Bolts, Cap Screws, and Jack Screws

Stud Bolts, Machine Bolts, Cap Screws, and Jack Screws are determined on the basis of existence in the bolt part data.

1-2 Bolt Type (first character is 'B')
3-4 Bolt Set Quantity
5-6 Bolt Diameter
7-8 Bolt Length
9-10 Bolt Thread Pitch
11-13 Bolting Geometric Industry Standard or Manufacturer
14-16 Bolting Materials Industry Standard and Grade
17-18 Bolt Coating
19-20 Industry Practice

Nuts

Nuts are determined on the basis of existence in the nut part data. Note that the nut height will not be explicitly included in the commodity code format for nuts. It is assumed that the nut type, the nominal bolt diameter, and the industry standard.

1-2 Nut Type (first character is 'N')
3-4 Nut Set Quantity
5-6 Bolt Diameter
7-9 Geometric Industry Standard or Manufacturer
10-12 Materials Industry Standard and Grade
13-14 Nut Coating Type
15-16 Industry Practice

Washers

Washers are determined on the basis of existence in the washer part data.

1-2 Washer Type (first character is 'W')
3-4 Washer Set Quantity
5-6 Bolt Diameter
7-8 Washer Thickness
9-11 Geometric Industry Standard or Manufacturer
12-14 Materials Industry Standard and Grade
15-16 Washer Coating Type
17-18 Industry Practice

Miscellaneous Parts

Miscellaneous Parts are determined by the Piping Component Class property having a value equal to the numeric equivalent of 'Accessories'.

1-3 Piping Component Type (first character is 'A')
4-5 Pressure Rating
6-7 Valve Manufacturer and Model Number
8-10 Geometric Industry Standard or Manufacturer
11-13 Materials Industry Standard and Grade
14-15 Miscellaneous Part Requisition Classification
16-17 Industry Practice

Note that jack screws may be defined as reportable piping commodities. In such cases, jack screws are determined by the Piping Component Class property having a value equal to the numeric equivalent of 'Accessories', and by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Miscellaneous Bolting'.

Stock Piping Specialties

Stock piping specialties are determined by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Relief devices', 'Flame arresters', 'Noise control devices', 'Pressure attenuation devices', 'Exhaust heads', 'Vents', 'Expansion joints', 'Swivel joints', 'Sampling devices', 'Strainers', 'Filters', or 'Steam traps'.

Note that some stock piping specialties, for example, valves, will have the industry commodity code based on a different, more appropriate, format.

1-3 Piping Component Type (first character is 'S')
4-5 Pressure Rating

6-7 End Preparation
8-9 Surface Preparation or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Piping Specialty Requisition Classification
18-19 Industry Practice

If the stock piping specialty is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Surface Preparation property is used.

Stock Instruments

Stock instruments are determined by the Piping Component Subclass property having a value equal to the numeric equivalent of 'Orifice plates', 'In-line instruments', 'In-line instruments, flow directional', 'Regulators', 'Instrument indicators', 'Instrument transmitters and process-connected switches', 'Other instrument end fittings', 'Switches and relays', 'Recorders', 'Analyzers', 'Other Sensors' or 'Miscellaneous Off- line Instruments'.

Some stock piping specialties, for example, valves, have the industry commodity code based on a different, more appropriate, format.

1-3 Piping Component Type (first character is 'I')
4-5 Pressure Rating
6-7 End Preparation
8-9 Surface Preparation or Lining Material
10-12 Geometric Industry Standard or Manufacturer
13-15 Materials Industry Standard and Grade
16-17 Instrument Requisition Classification
18-19 Industry Practice

If the stock instrument is lined, that is, the value of the Lining Requirement property is not equal to the numeric equivalent of 'Undefined', then the Lining Material property is used to form the 8th and 9th characters of the industry commodity code. Otherwise, the Surface Preparation property is used.

Off-line Instruments

Off-line instruments are determined by the Piping Component Class property having a value equal to the numeric equivalent of 'Off-line Instruments'.

1-3 Piping Component Type (first character is 'O')
4-6 Manufacturer and Model Number
7-8 Instrument Requisition Classification
9-10 Industry Practice

Appendix: Labels

This appendix contains information about all the labels delivered with the software. The labels in this appendix are grouped by type and then in alphabetical order.

In This Appendix

Compartmentation Labels

The following Compartmentation labels are delivered with the software.

Tool Tip Labels

CompartGeneralToolTip (on page 852)
CompartTightnessToolTip (on page 853)
LoadGeneralToolTip (on page 853)

CompartGeneralToolTip

Name: CompartGeneralToolTip
Description: Sample ToolTip for Compartmentation General
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

CompartTightnessToolTip

Name: CompartTightnessToolTip
Description: Sample ToolTip for Compartmentation Tightness
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: StructTightness
Name
SQL Query:

LoadGeneralToolTip

Name: LoadGeneralToolTip
Description: Sample ToolTip for Compartmentation Load General
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Diagnostic Labels

The following diagnostic labels are delivered with the software.

Common Occurrence Location

Name: Common Occurrence Location
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Z
Y
X
SQL Query:

CoordinateSystem

Name: CoordinateSystem
Description: Format for Tooltip for CoordinateSystems
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Z
Y
X
SQL Query:

```
Name="CoordinateSystem"
Description="Tooltip for CoordinateSystems">
Progid="SP3DReportsQueryBuilder.SQLQuery"
Action=""
Arg="" />
Progid="SP3DRuntimeQuery.CQueryInterpreter"
Action=""
Arg="" />
Timeout="0">
select
jname1.ItemName As 'Name',
jcoor.o0 As 'X',
jcoor.o1 As 'Y',
jcoor.o2 As 'Z',
jcoorp.Description As 'Desc'
from JDCoordinateSystem jcoor
Join JNamedItem jname1 on (jname1.oid = jcoor.oid)
Join SPGCoordinateSystemProperties jcoorp on (jcoorp.oid = jcoor.oid)
WHERE jcoor.oid = ?
Name="ByOID"
Site="User"
Path="Common ToolTip for CoordinateSystems.rqp" />
```

Delimiter

Name: Delimiter
Description: Separator for multiple properties for different standards
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Diagnostic Drawing Sheet Path

Name: Diagnostic Drawing Sheet Path
Description: Path of drawing sheet
Type: COM
Is Recursive: Yes
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Full Permission Group Folder Path

Name: Full Permission Group Folder Path
Description: Diagnostic Label for full parent folders path of permission group
Type: COM
Is Recursive: Yes
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: PGFolderName
SQL Query:

IFC NameA

Name: IFC NameA
Description: IFC Name for object A
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

IFC NameB

Name: IFC NameB
Description: IFC Name for object B
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

IFCObject Name

Name: IFCObject Name
Description: IFC Name for object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Interference Position X (East)

Name: Interference Position X (East)
Description: IFC x position
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT FoulPositionX,
FoulPositionY,
FoulPositionZ
FROM JIfcEntity
WHERE oid = ?
```

Interference Position Y (North)

Name: Interference Position Y (North)
Description: IFC y position
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT FoulPositionX,
FoulPositionY,
FoulPositionZ
FROM JIfcEntity
WHERE oid = ?
```

Interference Position Z (Up)

Name: Interference Position Z (Up)
Description: IFC z position
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT FoulPositionX,
FoulPositionY,
FoulPositionZ
FROM JIfcEntity
WHERE oid = ?
```

Permission Group Location

Name: Permission Group Location
Description: Diagnostic Label for Permission Group Location Name
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: LocationName
SQL Query:

Plant Breakdown Structure Path

Name: Plant Breakdown Structure Path
Description: Plant Breakdown Structure Path
Type: COM
Is Recursive: Yes
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: GGGGPName
GGGPName
GGPName
GPName
PName
Name
SQL Query:

Reference File Name

Name: Reference File Name
Description: Reference File Name for IFC report
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Reference Location

Name: Reference Location
Description:
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

SmartPlant To Do List P&ID Values

Name: SmartPlant To Do List P&ID Values
Description: Special label for EF Todo List
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

SmartPlant To Do List Property Names

Name: SmartPlant To Do List Property Names
Description: Special label for EF Todo List
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

SmartPlant To Do List SP3D Values

Name: SmartPlant To Do List SP3D Values
Description: Special label for EF Todo List
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Work Breakdown Structure Path

Name: Work Breakdown Structure Path
Description: Work Breakdown Structure Path
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Electrical Labels

The following electrical labels are delivered with the software.

Topics

Electrical Cable Conductor Size

Name: Electrical Cable Conductor Size
Description: Label for Cable Conductor Size
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: ConductorSize
SQL Query:

```
SELECT cabsz.SizeOfConductors AS ConductorSize
FROM JRteCableRun cabrun
LEFT JOIN XSpecifiedCable cabs ON cabs.oidOrigin = cabrun.oid
LEFT JOIN JCablePart cabprt ON cabprt.oid = cabs.oiddestination
LEFT JOIN JCableSize cabsz ON cabsz.oid = cabprt.oid
WHERE cabrun.oid = ?
```

Electrical Cable Diameter

Name: Electrical Cable Diameter
Description: Cable Diameter
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Diameter
SQL Query:

Electrical Cable Impedance

Name: Electrical Cable Impedance
Description: Cable Impedance Rating
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Impedance
SQL Query:

```
SELECT cabcap.Impedance AS Impedance
FROM JRteCableRun cabrun
LEFT JOIN XSpecifiedCable cabs ON cabs.oidOrigin = cabrun.oid
LEFT JOIN JCablePart cabprt ON cabprt.oid = cabs.oiddestination
LEFT JOIN JCableCapacity cabcap ON cabcap.oid = cabprt.oid
WHERE cabrun.oid = ?
```

Electrical Cable Length

Name: Electrical Cable Length
Description: Cable Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Electrical Cable Position X (East)

Name: Electrical Cable Position X (East)
Description: Cable Position X (East)
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Electrical Cable Position Y (North)

Name: Electrical Cable Position Y (North)
Description: Cable Position Y (North)
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Electrical Cable Position Z (Up)

Name: Electrical Cable Position Z (Up)
Description: Cable Position Z (Up)
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Electrical Cable Power

Name: Electrical Cable Power
Description: Cable Power Rating
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: PowerCapacity
SQL Query:

```
SELECT cabcap.PowerCapacity AS PowerCapacity
FROM JRteCableRun cabrun
LEFT JOIN XSpecifiedCable cabs ON cabs.oidOrigin = cabrun.oid
LEFT JOIN JCablePart cabprt ON cabprt.oid = cabs.oiddestination
```

```
LEFT JOIN JCableCapacity cabcap ON cabcap.oid = cabprt.oid
WHERE cabrun.oid = ?
```

Electrical Cable Weight

Name: Electrical Cable Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Electrical CableTray Bend Radius

Name: Electrical CableTray Bend Radius
Description: Cable Tray Bend Radius
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: BendRadius
SQL Query:

Electrical CableTray Branch Size

Name: Electrical CableTray Branch Size
Description: Size of Branch 1 on Cable Tray
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: ReducingSize
SQL Query:

Electrical CableTray Length

Name: Electrical CableTray Length
Description: Cable Tray Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: StockLength
SQL Query:

Electrical CableTray Nominal Depth

Name: Electrical CableTray Nominal Depth
Description: Cable Tray Nominal Depth
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NominalDepth
SQL Query:

Electrical CableTray Nominal Width

Name: Electrical CableTray Nominal Width
Description: Cable Tray Nominal Width
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NominalWidth
SQL Query:

Electrical CableTray Quantity

Name: Electrical CableTray Quantity
Description: Cable Tray Quantities
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

Electrical CableTray Rung Spacing

Name: Electrical CableTray Rung Spacing
Description: Cable Tray Rung Spacing
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: RungSpacing
SQL Query:

Electrical CableTray Tangent Length

Name: Electrical CableTray Tangent Length
Description: Cable Tray Tangent Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: TangentLength
SQL Query:

Electrical CableTray Weight

Name: Electrical CableTray Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Equipment Labels

The following equipment labels are delivered with the software.

Topics

Equipment ToolTip for Equipment

Name: Equipment ToolTip for Equipment
Description: Tooltip Label for Equipment
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Equipment Combined Wet and Dry Weights

Name: Equipment Combined Wet and Dry Weights
Description: Wet weight and Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DryWeight
SQL Query:

Equipment Dry Weight

Name: Equipment Dry Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Equipment Insulation Thickness

Name: Equipment Insulation Thickness
Description: Get UOM Formatted Thickness of Equipment Insulation
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Insulation Thickness
SQL Query:

Equipment Nozzle Location

Name: Equipment Nozzle Location
Description: Location of nozzles
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NozZ
NozY
NozX
SQL Query:

Equipment Nozzle NPD

Name: Equipment Nozzle NPD
Description: Primary Size NPD with units
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NPDUnitType
NPD
SQL Query:

Equipment Nozzle Orientation

Name: Equipment Nozzle Orientation
Description: orientation for nozzles
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NozDirZ
NozDirY
NozDirX
SQL Query:

Equipment Occurrence Location

Name: Equipment Occurrence Location
Description: location
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: X
SQL Query:

Equipment Vessel Occurrence Location X (East)

Name: Equipment Vessel Occurrence Location X (East)
Description: Location in X (East)
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: X
SQL Query:

Equipment Vessel Occurrence Location Y (North)

Name: Equipment Vessel Occurrence Location Y (North)
Description: Location in Y (North)
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Y
SQL Query:

Equipment Vessel Occurrence Location Z (Up)

Name: Equipment Vessel Occurrence Location Z (Up)
Description: Location in Z (Up)
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Z
SQL Query:

Equipment with Repeating Nozzles

Name: Equipment with Repeating Nozzles
Description: List Equipment name and all the nozzle names, NPDs and End Preps that are connected on this Equipment
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Hangers and Supports Labels

The following hangers and supports labels are delivered with the software.

Topics

Hangers and Supports Tooltip for Supports

Name: Hangers and Supports ToolTip for Supports
Description: Tooltip for Supports
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Max Load
SQL Query:

Hangers and Supports Description

Name: Hangers and Supports Description
Description: Description for Hangers and Supports and related structure
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Cut Length
SQL Query:

HVAC Labels

The following HVAC labels are delivered with the software.

Topics

HVAC Angle Value

Name: HVAC Angle Value
Description: Formatted value of an angle
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Angle
SQL Query:

HVAC Component Cross Section Size for Branch One

Name: HVAC Component Cross Section Size for Branch One
Description: Cross section size of first branch (or port 3) of HVAC components
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
CornerRadius
Width

Depth
SQL Query:

HVAC Component Cross Section Size for Branch Two

Name: HVAC Component Cross Section Size for Branch Two
Description: Cross section size of second branch (or port 4) of HVAC components
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
CornerRadius
Width
Depth
SQL Query:

HVAC Component Inlet Cross Section Size

Name: HVAC Component Inlet Cross Section Size
Description: Cross section size of Inlet (or port 1) of HVAC components
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
CornerRadius
Width
Depth
SQL Query:

HVAC Component Outlet Cross Section Size

Name: HVAC Component Outlet Cross Section Size
Description: Cross section size of Outlet (or port 2) of HVAC components
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
CornerRadius
Width
Depth
SQL Query:

HVAC Damper Quantity

Name: HVAC Damper Quantity
Description: UOM of quantity total if length, otherwise number (Preferably for Reports)
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

HVAC Duct Length

Name: HVAC Duct Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

HVAC Duct Weight

Name: HVAC Duct Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

HVAC Fabricated Weight

Name: HVAC Fabricated Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

HVAC Fitting Quantity

Name: HVAC Fitting Quantity
Description: UOM of quantity total if length, otherwise number (Preferably for Reports)
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

HVAC Linear Duct Cross Section Size

Name: HVAC Linear Duct Cross Section Size
Description: Cross section size of HVAC linear ducts
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
CornerRadius
Width
Depth
SQL Query:

HVAC Register Quantity

Name: HVAC Register Quantity
Description: UOM of quantity total if length, otherwise number (Preferably for Reports)
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

HVAC Transition Cross Section Size

Name: HVAC Transition Cross Section Size
Description: Description of transition with 2 CrossSection Shapes but without sizes
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

HVAC Transition Length

Name: HVAC Transition Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

HVAC Transition Quantity

Name: HVAC Transition Quantity
Description: UOM of quantity total if length, otherwise number (Preferably for Reports)
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

HVAC Transition Weight

Name: HVAC Transition Weight
Description: Weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

HVAC CFM

Name: HVAC CFM
Description: HVAC CFM
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CFM
SQL Query:

Instrumentation Labels

The following instrumentation labels are delivered with the software.

Topics

402

Name: 402
Description: Plant Design System (PDS) Instrument Tag. The name of this label must be 402 in order to map properly.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Tag
SQL Query:

Instrumentation Control Valves NPD with Unit Secondary

Name: Instrumentation Control Valves NPD with Unit Secondary
Description: NPD with units for secondary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Instrumentation Control Valves NPD with Unit Primary

Name: Instrumentation Control Valves NPD with Unit Primary
Description: NPD with units for primary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Molded Forms Labels

The following Molded Forms labels are delivered with the software.

Plate Thickness (on page 877)

Tool Tip Labels

Plate Material Type Grade Thickness (on page 876)
Plate Thickness (on page 877)
Plate Thickness Material Grade (on page 878)
Profile Cross-section (on page 879)
Profile Cross-section Material Type Grade (on page 879)
Structure Material Grade (on page 880)
Structure Material Type (on page 880)

Plate Material Type Grade Thickness

Name: Plate Material Type Grade Thickness
Description:
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Thickness
SQL Query:
```
set @oid = ?
select
coalesce
(
mat_1.MaterialType + ' ; ' + mat_1.MaterialGrade,
mat_2.MaterialType + ' ; ' + mat_2.MaterialGrade,
mat_3.MaterialType + ' ; ' + mat_3.MaterialGrade,
'none'
) as Material,
coalesce (pd_1.Thickness, pd_2.Thickness, pd_3.Thickness) as Thickness
from JPlate as p
-- Find the parent of the plate and the parent's parent for obtaining
-- values that do not exist on the plate. This will be the case on
```

```
-- leaf plates for example.
left join XShpStrDesignHierarchy as ssdh_1
on ssdh_1.oidDestination = p.oid
left join XShpStrDesignHierarchy as ssdh_2
on ssdh_2.oidDestination = ssdh_1.oidOrigin
-- Get the dimensions of the plate
left join XPlateHasDimensions as phd_1
on phd_1.OidDestination = p.oid
left join JDPlateDimensions as pd_1
on pd_1.Oid = phd_1.OidOrigin
-- In the case that the plate does not have dimensions, get the
dimensions
-- of its parent plate.
left join XPlateHasDimensions as phd_2
on phd_2.OidDestination = ssdh_1.oidOrigin
left join JDPlateDimensions as pd_2
on pd_2.Oid = phd_2.OidOrigin
-- Go up one more level if necessary to get a plate with dimensions on
it.
left join XPlateHasDimensions as phd_3
on phd_3.OidDestination = ssdh_2.oidOrigin
left join JDPlateDimensions as pd_3
on pd_3.Oid = phd_3.OidOrigin
-- Check Material
left join XSystemHasMaterial hasMat_1
on hasMat_1.oidDestination = p.oid
left join JDMaterial mat_1
on mat_1.oid = hasMat_1.oidOrigin
left join XSystemHasMaterial hasMat_2
on hasMat_2.oidDestination = ssdh_1.oidOrigin
left join JDMaterial mat_2
on mat_2.oid = hasMat_2.oidOrigin
left join XSystemHasMaterial hasMat_3
on hasMat_3.oidDestination = ssdh_2.oidOrigin
left join JDMaterial mat_3
on mat_3.oid = hasMat_3.oidOrigin
-- Specify the plate of interest.
```

Plate Thickness

Name: Plate Thickness
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID:
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Plate Thickness
SQL Query:

Plate Thickness Material Grade

Name: Plate Thickness Material Grade
Description:
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Thickness
SQL Query:

```
set @oid = ?
select
coalesce
(
mat_1.MaterialGrade,
mat_2.MaterialGrade,
mat_3.MaterialGrade,
'none'
) as Material,
coalesce (pd_1.Thickness, pd_2.Thickness, pd_3.Thickness) as Thickness
from JPlate as p
-- Find the parent of the plate and the parent's parent for obtaining
-- values that do not exist on the plate. This will be the case on
-- leaf plates for example.
left join XShpStrDesignHierarchy as ssdh_1
on ssdh_1.oidDestination = p.oid
left join XShpStrDesignHierarchy as ssdh_2
on ssdh_2.oidDestination = ssdh_1.oidOrigin
-- Get the dimensions of the plate
left join XPlateHasDimensions as phd_1
on phd_1.OidDestination = p.oid
left join JDPlateDimensions as pd_1
on pd_1.Oid = phd_1.OidOrigin
-- In the case that the plate does not have dimensions, get the
dimensions
-- of its parent plate.
left join XPlateHasDimensions as phd_2
on phd_2.OidDestination = ssdh_1.oidOrigin
left join JDPlateDimensions as pd_2
on pd_2.Oid = phd_2.OidOrigin
-- Go up one more level if necessary to get a plate with dimensions on
it.
left join XPlateHasDimensions as phd_3
on phd_3.OidDestination = ssdh_2.oidOrigin
left join JDPlateDimensions as pd_3
on pd_3.Oid = phd_3.OidOrigin
-- Check Material
left join XSystemHasMaterial hasMat_1
on hasMat_1.oidDestination = p.oid
left join JDMaterial mat_1
on mat_1.oid = hasMat_1.oidOrigin
left join XSystemHasMaterial hasMat_2
```

```
on hasMat_2.oidDestination = ssdh_1.oidOrigin
left join JDMaterial mat_2
on mat_2.oid = hasMat_2.oidOrigin
left join XSystemHasMaterial hasMat_3
on hasMat_3.oidDestination = ssdh_2.oidOrigin
left join JDMaterial mat_3
on mat_3.oid = hasMat_3.oidOrigin
-- Specify the plate of interest.
where p.OID = @oid
```

Profile Cross-section

Name: Profile Cross-section
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID:
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Profile Cross-section
SQL Query:

Profile Cross-section Material Type Grade

Name: Profile Cross-section Material Type Grade
Description:
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
set @oid = ?
select
coalesce
(
mat_1.MaterialType + ' ; ' + mat_1.MaterialGrade,
mat_2.MaterialType + ' ; ' + mat_2.MaterialGrade,
mat_3.MaterialType + ' ; ' + mat_3.MaterialGrade,
'none'
) as Material,
coalesce (pd_1.SectionName,
pd_2.SectionName, pd_3.SectionName) as SectionType
from JProfile as p
left join XShpStrDesignHierarchy as ssdh_1
on ssdh_1.oidDestination = p.oid
left join XShpStrDesignHierarchy as ssdh_2
on ssdh_2.oidDestination = ssdh_1.oidOrigin
left join XGeometryToProfile as phae_1
on phae_1.oidDestination = p.oid
left join XProfileSystemSection as phd_1
```

```
on phd_1.oidOrigin = phae_1.oidOrigin
left join JStructCrosssection as pd_1
on pd_1.Oid = phd_1.OidDestination
left join XGeometryToProfile as phae_2
on phae_2.oidDestination = ssdh_1.oidOrigin
left join XProfileSystemSection as phd_2
on phd_2.oidOrigin = phae_2.oidOrigin
left join JStructCrosssection as pd_2
on pd_2.Oid = phd_2.OidDestination
left join XGeometryToProfile as phae_3
on phae_3.oidDestination = ssdh_2.oidOrigin
left join XProfileSystemSection as phd_3
on phd_3.OidOrigin = phae_3.oidOrigin
left join JStructCrosssection as pd_3
on pd_3.Oid = phd_3.OidDestination
left join XSystemHasMaterial hasMat_1
on hasMat_1.oidDestination = p.oid
left join JDMaterial mat_1
on mat_1.oid = hasMat_1.oidOrigin
left join XSystemHasMaterial hasMat_2
on hasMat_2.oidDestination = ssdh_1.oidOrigin
left join JDMaterial mat_2
on mat_2.oid = hasMat_2.oidOrigin
left join XSystemHasMaterial hasMat_3
on hasMat_3.oidDestination = ssdh_2.oidOrigin
left join JDMaterial mat_3
on mat_3.oid = hasMat_3.oidOrigin
```

Structure Material Grade

Name: Structure Material Grade
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID:
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Structure Material Grade
SQL Query:

Structure Material Type

Name: Structure Material Type
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID:
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Structure Material Type
SQL Query:

Piping Labels

The following piping labels are delivered with the software.

Topics

400

Name: 400
Description: Comp Commodity Code
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Industry Commodity Code
SQL Query:

400

Name: 400
Description: Plant Design System (PDS) Pipe Component Commodity Code. The name of this label must be 400 in order to map properly.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Industry Commodity Code
SQL Query:

401

Name: 401
Description: Sch_Format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

401

Name: 401
Description: Plant Design System (PDS) Straight Pipe sch/thk. The name of this label must be 401 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

403

Name: 403
Description: Sch_Format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

403

Name: 403
Description: Plant Design System (PDS) Pipe Component sch/thk of port1. The name of this label must be 403 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

406

Name: 406
Description: Comp sch/thk 1 b format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

406

Name: 406
Description: Plant Design System (PDS) Pipe Component sch/thk of port1 bore. The name of this label must be 406 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

407

Name: 407
Description: Comp sch/thk 2 format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

407

Name: 407
Description: Plant Design System (PDS) Pipe Component sch/thk of port2. The name of this label must be 407 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

409

Name: 409
Description: Comp sch/thk 2 b format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

409

Name: 409
Description: Plant Design System (PDS) Pipe Component sch/thk of port2 bore. The name of this label must be 409 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

411

Name: 411
Description: Comp sch/thk 3 Format
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

411

Name: 411
Description: Plant Design System (PDS) Pipe Component sch/thk of port3. The name of this label must be 411 in order to map properly.
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

412

Name: 412
Description: Comp sch/thk 1x2
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT '[401] x [407]' AS SizeSchedule
SELECT '[401] x [407]' AS SizeSchedule FROM Dual
```

412

Name: 412
Description: Plant Design System (PDS) Pipe Component sch/thk of port1 X port 2. The name of this label must be 412 in order to map properly.
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
SELECT '[401] x [407]' AS SizeSchedule
SELECT '[401] x [407]' AS SizeSchedule FROM Dual

414

Name: 414
Description: Comp sch/thk 1x2b
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT '[401] x [409]' AS SizeSchedule
SELECT '[401] x [409]' AS SizeSchedule FROM Dual
```

414

Name: 414
Description: Plant Design System (PDS) Pipe Component sch/thk of port1 X port 2 bore. The name of this label must be 414 in order to map properly.
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
SELECT '[401] x [409]' AS SizeSchedule
SELECT '[401] x [409]' AS SizeSchedule FROM Dual

416

Name: 416
Description: Comp sch/thk 1x3
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT '[403] x [411]' AS SizeSchedule
SELECT '[403] x [411]' AS SizeSchedule FROM Dual
```

416

Name: 416
Description: Plant Design System (PDS) Pipe Component sch/thk of port1 X port 3. The name of this label must be 416 in order to map properly.
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
SELECT '[403] x [411]' AS SizeSchedule
SELECT '[403] x [411]' AS SizeSchedule FROM Dual

417

Name: 417
Description: Comp sch/thk 1x3b
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT '[403] x [413]' AS SizeSchedule
SELECT '[403] x [413]' AS SizeSchedule FROM Dual
```

417

Name: 417
Description: Plant Design System (PDS) Pipe Component sch/thk of port1 X port 3 bore. The name of this label must be 417 in order to map properly.
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT '[403] x [413]' AS SizeSchedule
SELECT '[403] x [413]' AS SizeSchedule FROM Dual
```

425

Name: 425
Description: ReinforcingPad Format
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: RPadThickness
RPadWidth
Angle
SQL Query:

425

Name: 425
Description: Plant Design System (PDS) RPAD width x thick. The name of this label must be 425 in order to map properly.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: RPadThickness
RPadWidth
Angle
SQL Query:

429

Name: 429
Description: Face To Face Format
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: FacetoFace
SQL Query:

429

Name: 429
Description: Plant Design System (PDS) Blank/Spacer thk. The name of this label must be 429 in order to map properly.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: FacetoFace
SQL Query:

Flanges

Name: Flanges Label
Description: Material Description Label for Flanges
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.FlangeFaceSurfaceFinish_ShortValue as FlngFaceSurFinish_ShortValue,
Pcom.LiningMaterial_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClFFSF.SHORTSTRINGVALUE as FlngFaceSurFinish_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
Left OUTER join CL_FLANGEFACESURFACEFINISH ClFFSF on
(Mfd.FlangeFaceSurfaceFinish = ClFFSF.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
```

```
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Gaskets Label

Name: Gaskets
Description: Material Description Label for Gaskets
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
Select distinct JG.GasketType_ShortValue,
JEC.PressureRating_LongValue,
JG.ThicknessFor3DModel,
JG.Manufacturer_ShortValue, JG.StyleNumber_ShortValue,
JG.GasketIndustryStandard_ShortValue as GsktIndStandard_ShortValue,
JG.MaterialsGrade_ShortValue,
JG.FlangeFacing_ShortValue from dbo.JGasket_CL JG
join JGasketselectionFilter JGSF ON (JGSF.ContractorCommoditycode =
JG.IndustryCommoditycode)
join JEndConditions_CL JEC ON (JGSF.oid = JEC.oid)
join XImpliedMatingParts Imp ON (JG.oid = Imp.oiddestination)
where Imp.oidOrigin= ?
Select distinct ClGsktT.SHORTSTRINGVALUE as GasketType_ShortValue,
ClPR.LONGSTRINGVALUE as PressureRating_LongValue,
JG.ThicknessFor3DModel,
ClMfd.SHORTSTRINGVALUE as Manufacturer_ShortValue,
CLGSN.SHORTSTRINGVALUE as StyleNumber_ShortValue,
ClGIS.SHORTSTRINGVALUE as GsktIndStandard_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClFF.SHORTSTRINGVALUE as FlangeFacing_ShortValue
from CL_GasketType ClGsktT
join JGasket JG ON (ClGsktT.VALUEID = JG.GasketType)
join JGasketselectionFilter JGSF ON (JGSF.ContractorCommoditycode =
JG.IndustryCommoditycode)
join JEndConditions JEC ON (JGSF.oid = JEC.oid)
join CL_PressureRating ClPR ON (ClPR.VALUEID = JEC.PressureRating)
join CL_MANUFACTURER ClMfd ON (ClMfd.VALUEID = JG.Manufacturer)
join CL_GasketStyleNumber CLGSN ON (CLGSN.VALUEID = JG.StyleNumber)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
JG.GasketIndustryStandard)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = JG.MaterialsGrade)
join CL_FLANGEFACING ClFF on (ClFF.VALUEID = JG.FlangeFacing)
```

```
join XImpliedMatingParts Imp ON (JG.oid = Imp.oiddestination)
where Imp.oidOrigin= ?
```

Miscellaneous Fittings Label

Name: Miscellaneous Fittings
Description: Material Description Label for Miscellaneous Fittings
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.SurfacePreparation_ShortValue, Pcom.LiningMaterial_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue from
CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
```

```
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
= ClSPre.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Miscellaneous Parts Label

Name: Miscellaneous Parts
Description: Material Description Label for Miscellaneous Parts
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue, '[Pressure Rating 1]' As
PressureRating,
Mfd.ValveManufacturer_ShortValue, Mfd.ValveModelNumber_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
Select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
'[Pressure Rating 1]' As PressureRating,
ClVMf.SHORTSTRINGVALUE as ValveManufacturer_ShortValue,
ClVMN.SHORTSTRINGVALUE as ValveModelNumber_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join CL_VALVEMANUFACTURER ClVMf on (ClVMf.VALUEID =
Mfd.ValveManufacturer)
join CL_VALVEMODELNUMBER ClVMN on (ClVMN.VALUEID =
Mfd.ValveModelNumber)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
```

```
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on (ClMRC.VALUEID
= Mfd.MiscRequisitionClassification)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Nuts Label

Name: Nuts Label
Description: Material Description Label for Nuts
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
Select distinct JNut.NutType_ShortValue,
RteN.NutQuantity,
JNut.NutHeight,
JNSF.BoltDiameter,
JNut.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, JGMCD.Manufacturer_ShortValue,
JNut.MaterialsGrade_ShortValue,
JNut.CoatingType_ShortValue from dbo.JNut_CL JNut
join JNUtselectionFilter JNSF ON (JNSF.ContractorCommoditycode =
JNut.IndustryCommoditycode)
join XImpliedMatingParts Imp ON (JNut.oid = Imp.oiddestination)
join dbo.JRteNut RteN ON (Imp.oidOrigin = RteN.Oid)
join dbo.JGenericMaterialControlData_CL JGMCD on
(JGMCD.ContractorCommoditycode = JNut.IndustryCommoditycode)
where Imp.oidOrigin=?
Select distinct ClNutT.SHORTSTRINGVALUE as NutType_ShortValue,
JNut.NutHeight,
JNSF.BoltDiameter,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE as Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClCoaT.SHORTSTRINGVALUE as CoatingType_ShortValue
from CL_NutType ClNutT
join JNut JNut on (ClNutT.VALUEID = Jnut.NutType)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
JNut.GeometricIndustryStandard)
join JGenericMaterialControlData JGMCD on
(JGMCD.ContractorCommoditycode = JNut.IndustryCommoditycode)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = JGMCD.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = JNut.MaterialsGrade)
join CL_CoatingType ClCoaT on (ClCoaT.VALUEID = JNut.CoatingType)
join JNUtselectionFilter JNSF ON (JNSF.ContractorCommoditycode =
JNut.IndustryCommoditycode)
join XImpliedMatingParts Imp ON (JNut.oid = Imp.oiddestination)
where Imp.oidOrigin=?
```

Off-line Instruments Label

Name: Off-line Instruments Label
Description: Material Description Label for Off-line Instruments
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
Mfd.ValveManufacturer_ShortValue, Mfd.ValveModelNumber_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
Left OUTER join dbo.JUAManufacturerData_CL Mfd ON (pcom.oid = Mfd.oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
ClVMf.SHORTSTRINGVALUE as ValveManufacturer_ShortValue,
ClVMN.SHORTSTRINGVALUE as ValveModelNumber_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
Left OUTER join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
Left OUTER join CL_VALVEMANUFACTURER ClVMf on (ClVMf.VALUEID =
Mfd.ValveManufacturer)
Left OUTER join CL_VALVEMODELNUMBER ClVMN on (ClVMN.VALUEID =
Mfd.ValveModelNumber)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Pipe Line List Insulation Temperature

Name: Pipe Line List Insulation Temperature
Description: Pipe Line List Insulation Temperature
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: InsulationTemperature
SQL Query:

Pipe Line List Nominal Diameter

Name: Pipe Line List Nominal Diameter
Description: Pipe Line List Nominal Diameter
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NPD
SQL Query:

Pipe Line List Operating Pressure

Name: Pipe Line List Operating Pressure
Description: Pipe Line List Operating Maximum Pressure
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: OperatingPressure
SQL Query:

Pipe Line List Operating Temperature

Name: Pipe Line List Operating Temperature
Description: Pipe Line List Operating Maximum Temperature
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: OperatingTemperature
SQL Query:

Pipe Run for Tooltips and Drawings

Name: Pipe Run for Tooltips and Drawings
Description: Example of a Label for PipeRun
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NPDUnits
NPD
InsulationPurpose
FluidCode
PipeSpec

Name
SQL Query:

Pipe Stock and Nipples Label

Name: Pipe Stock and Nipples Label
Description: Material Description Label for Pipe Stock and Nipples
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.SurfacePreparation_ShortValue, Pcom.LiningMaterial_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue, Mfd.ManufacturingMethod,
FtoF.FacetoFace, Psto.PurchaseLength from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
Left outer join dbo.JFaceToFace FtoF ON (FtoF.Oid = Pcom.Oid)
Left outer join dbo.JDPipeStock Psto ON (Psto.Oid = Pcom.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
Select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
Mfd.ManufacturingMethod,
FtoF.FacetoFace, Psto.PurchaseLength from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
```

```
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
= ClSPre.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left outer join JFaceToFace FtoF ON (FtoF.Oid = Pcom.Oid)
Left outer join JDPipeStock Psto ON (Psto.Oid = Pcom.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Piping Component Client Commodity Code

Name: Piping Component Client Commodity Code
Description: Piping Component Procurement Client Commodity Code
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Procurement Client Commodity Code
SQL Query:

Piping Component Material Description

Name: Piping Component Material Description
Description: Pipe Component Material Description
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Component NPD

Name: Piping Component NPD
Description: Comp NPD1 X NPD2
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT dbo.REPORTConvertNPD('in',pco.PriSizeNPDUnits, pco.PrimarySize)
AS 'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
```

```
dbo.REPORTConvertNPD('in',pco.SecSizeNPDUnits, pco.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2'
FROM xmadefrom rmf
JOIN JDPipeComponent pco on (pco.oid = rmf.oiddestination)
WHERE rmf.oidorigin = ?
SELECT RPTConvertNPD('in',pco.PriSizeNPDUnits, pco.PrimarySize) AS
NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',pco.SecSizeNPDUnits, pco.SecondarySize) AS NPD2,
'in' AS NPDUnitType2
FROM xmadefrom rmf
JOIN JDPipeComponent pco on (pco.oid = rmf.oiddestination)
WHERE rmf.oidorigin = ?
```

Piping Component Quantity

Name: Piping Component Quantity
Description: Quantities
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: QuantityTotal
SQL Query:

Piping Component Sequence ID

Name: Piping Component Sequence ID
Description: Piping Component Sequence ID
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Sequence Id
SQL Query:

Piping Fittings NPD with Unit Primary

Name: Piping Fittings NPD with Unit Primary
Description: NPD with units for primary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Fittings NPD with Unit Secondary

Name: Piping Fittings NPD with Unit Secondary
Description: NPD with units for secondary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Icarus Closest Parent Area in System Hierarchy

Name: Piping Icarus Closest Parent Area in System Hierarchy
Description: Format for Name of closest parent area in system Hierarchy
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
SELECT
'AreaName' =
CASE
WHEN bbb.AreaName Is NULL THEN aaa.ItemName
ELSE bbb.AreaName
END
FROM
(SELECT pli.ItemName FROM JConfigProjectRoot cpr
JOIN JNamedItem pli ON pli.oid=cpr.oid) as aaa
LEFT JOIN (SELECT TOP 1 right(pni.ItemName,24) as 'AreaName'
FROM dbo.REPORTGetAllParentsInHierarchy (? , 'SystemHierarchy') aph
JOIN JAreaSystem ars on ars.oid = aph.oidParent
JOIN JNamedItem pni on pni.oid = aph.oidparent
ORDER BY aph.depth) as bbb ON 1=1
SELECT CASE
WHEN bbb.AreaName Is NULL THEN aaa.ItemName
ELSE bbb.AreaName
```

```
END AreaName
FROM ( SELECT pli.ItemName
FROM JConfigProjectRoot cpr
JOIN JNamedItem pli ON pli.oid=cpr.oid ) aaa
LEFT JOIN ( SELECT SUBSTR(pni.ItemName,-24) as AreaName
FROM TABLE(RPTAllParentsInHierarchy (? , 'SystemHierarchy')) aph
JOIN JAreaSystem ars on ars.oid = aph.oidParent
JOIN JNamedItem pni on pni.oid = aph.oidparent
WHERE rownum = 1
ORDER BY aph.depth) bbb ON 1=1
```

Piping Icarus Design Maximum Pressure

Name: Piping Icarus Design Maximum Pressure
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DesignMaxPressure
SQL Query:

Piping Icarus Design Maximum Temperature

Name: Piping Icarus Design Maximum Temperature
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DesignMaxTemp
SQL Query:

Piping Icarus Fluid Density

Name: Piping Icarus Fluid Density
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: FluidDensity
SQL Query:

Piping Icarus Fluid Viscosity

Name: Piping Icarus Fluid Viscosity
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID:
Returned Properties:
SQL Query:

Piping Icarus Gas Flow Rate

Name: Piping Icarus Gas Flow Rate
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: GasFlowRate
SQL Query:

Piping Icarus Liquid Flow Rate

Name: Piping Icarus Liquid Flow Rate
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: LiquidFlowRate
SQL Query:

Piping Isometric Bolt Sized Commodity Code

Name: Piping Isometric Bolt Sized Commodity Code
Description: A label of the SizedCommodityCode attribute from the IJUASizedBoltData interface
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Sized Commodity Code
SQL Query:

Piping Isometric Component Remark

Name: Piping Isometric Component Remark
Description: Piping Isometric Component Remark
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Text
SQL Query:

Piping Isometric Component Tag

Name: Piping Isometric Component Tag
Description: Example of Iso Component Tag
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Piping Isometric Continuation Label Type A

Name: Piping Isometric Continuation Label Type A
Description: Example of Iso Continaution label
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Schedule
EndPrep
PressureRating
PriSizeNPDUnit
PrimarySize
NozzleTag
EquipmentNamewithComponent
EquipmentName
SQL Query:

Piping Isometric DrawingFrame Pressure UOM

Name: Piping Isometric DrawingFrame Pressure UOM
Description: Sample Default Pressure UOM
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Field1
SQL Query:

Piping Isometric DrawingFrame Temperature UOM

Name: Piping Isometric DrawingFrame Temperature UOM
Description: Sample Default Temperture UOM
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Field1
SQL Query:

Piping Isometric Extraction Date

Name: Piping Isometric Extraction Date
Description: Test for Dates
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT Getdate() AS ToDayDate
SELECT sysdate ToDayDate FROM dual
```

Piping Isometric Extraction Date European Format

Name: Piping Isometric Extraction Date European Format
Description: Test for Dates
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT Getdate() AS ToDayDate
SELECT sysdate ToDayDate FROM dual
```

Piping Isometric Extraction Date ISO8601 Format

Name: Piping Isometric Extraction Date ISO8601 Format
Description: Test for Dates
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT Getdate() AS ToDayDate
SELECT sysdate ToDayDate FROM dual
```

Piping Isometric Extraction Date Locale Sensitive

Name: Piping Isometric Extraction Date Locale Sensitive
Description: Test for Dates
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT Getdate() AS ToDayDate
SELECT sysdate ToDayDate FROM dual
```

Piping Isometric Gasket Client Commodity Code

Name: Piping Isometric Gasket Client Commodity Code
Description: Piping Gasket Client Commodity Code
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Procurement Client Commodity Code
SQL Query:

Piping Isometric Hanger Support Part Number

Name: Piping Isometric Hanger Support Part Number
Description: HgrSupport Part Number
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: PartNumber
SQL Query:

Piping Isometric Pipe Line Continuation

Name: Piping Isometric Pipe Line Continuation
Description: Pipeline Continuation Label for Isometrics
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Piping Isometric Pipe Line Reference

Name: Piping Isometric Pipe Line Reference
Description: Example of MetaTemplate for Labeling
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Piping Isometric Piping Commodity Code

Name: Piping Isometric Piping Commodity Code
Description: Test for Dates
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: IndustryCommodityCode
SQL Query:

Piping Isometric Spectacle Blind Operation

Name: Piping Isometric Spectacle Blind Operation
Description: Spectacle Blind Opening Position
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SpectaclePosition
SQL Query:

Piping Isometric Spool Continuation

Name: Piping Isometric Spool Continuation
Description: Spool Continuation Label for Isometrics
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: PartName
Name
SQL Query:

Piping Isometric Valve Tag

Name: Piping Isometric Valve Tag
Description: Tag of a valve
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Tag
Name
SQL Query:

Piping Isometric WBS Item Continuation

Name: Piping Isometric WBS Item Continuation
Description: WBS Item Continuation Label for Isometrics
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
wbs.WBSPurpose as Purpose,
wn.itemname as "WBS Name"
```

```
FROM JPartOcc po
LEFT JOIN XOwnsParts xop on xop.oiddestination = po.oid
LEFT join XSystemHierarchy xsh on xsh.oiddestination = xop.oidorigin
LEFT JOIN JNamedItem n on n.oid = xsh.oidorigin
LEFT JOIN XBelongsToWBSItem xbtw on xbtw.oiddestination = po.oid
LEFT JOIN JWBSItem wbs on wbs.oid = xbtw.oidorigin
LEFT JOIN JNamedItem wn on wn.oid =wbs.oid
```

Piping Isometric Weld Sequence Number

Name: Piping Isometric Weld Sequence Number
Description: Label that outputs the weld's sequence number.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Sequence Id
SQL Query:

Piping Isometric Weld Type and Sequence Number

Name: Piping Isometric Weld Type and Sequence Number
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Nipple Spool NPD with Unit Primary

Name: Piping Nipple Spool NPD with Unit Primary
Description: NPD with units for primary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Pipe Insulation Temperature

Name: Piping Pipe Insulation Temperature
Description: Pipe Insulation Temperature
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Insulation Temperature
SQL Query:

Piping Pipe Insulation Thickness

Name: Piping Pipe Insulation Thickness
Description: Get UOM Formatted Thickness of Pipe Insulation
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Insulation Thickness
SQL Query:

Piping Pipe Length

Name: Piping Pipe Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Piping Pipe Run Insulation Thickness 2

Name: Piping Pipe Run Insulation Thickness 2
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: InsulationThickness
SQL Query:

Piping Pipe Run Operating Maximum Temperature

Name: Piping Pipe Run Operating Maximum Temperature
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: OperatingMaxTemp
SQL Query:

Piping Pipe Run Thickness

Name: Piping Pipe Run Thickness
Description:
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: WallThickness
SQL Query:
```
SELECT pp.WallThicknessOrGrooveSetback AS WallThickness
FROM XMadeFrom rmf
LEFT JOIN XPartContainsNozzles rpcn on rpcn.oidorigin =
rmf.oiddestination
LEFT JOIN JCatalogPipePort pp on pp.oid = rpcn.oiddestination
WHERE pp.TerminationClass = 10 and pp.PortIndex=2 and rmf.oidorigin=?
```

Piping Pipe Run Tracing Temperature

Name: Piping Pipe Run Tracing Temperature
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: TracingTemp
SQL Query:

Piping Pipes Length

Name: Piping Pipes Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Piping Pipes NPD with Unit

Name: Piping Pipes NPD with Unit
Description: NPD with units
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NPDUnitType
NPD
SQL Query:

Piping Piping Length

Name: Piping Piping Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Piping Piping NPD with Unit

Name: Piping Piping NPD with Unit
Description: NPD with units
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NPDUnitType
NPD
SQL Query:

Piping Stress Analysis Corrosion Allowance

Name: Piping Stress Analysis Corrosion Allowance
Description: Corrosion Allowance per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CorrosionAllowance
SQL Query:

Piping Stress Analysis Dry Weight in kg

Name: Piping Stress Analysis Dry Weight in kg
Description: Dry Weight per part (Kg), for export to stress analysis
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

```
SELECT jwcg.DryWeight AS Weight
FROM JWeightCG jwcg
WHERE jwcg.oid = ?
```

Piping Stress Analysis Dry Weight in lbm

Name: Piping Stress Analysis Dry Weight in lbm
Description: Dry Weight per part, for export to stress analysis
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

```
SELECT jwcg.DryWeight AS Weight
FROM JWeightCG jwcg
WHERE jwcg.oid = ?
```

Piping Stress Analysis Fluid Density

Name: Piping Stress Analysis Fluid Density
Description: Fluid density per part, for export to stress analysis
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: FluidDensity
SQL Query:

```
FROM JRtePathGenPart jpgp
JOIN XOwnsParts rop on rop.oiddestination = jpgp.oid
JOIN JProcessDataInfo jpdi on jpdi.oid = rop.oidorigin
JOIN YPipelinetoPipingParts eppp on eppp.oidorigin = jpgp.oid
JOIN JPipelineSystem jps on jps.oid = eppp.oiddestination
JOIN JFluidDensityRule jfdr on jfdr.FluidCode = jps.FluidCode
WHERE jpdi.OperatingMaxTemp Between TemperatureFrom AND TemperatureTo
```

Piping Stress Analysis Insulation Density

Name: Piping Stress Analysis Insulation Density
Description: Insulation density per part, for export to stress analysis
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: InsulationDensity
SQL Query:

```
CASE
WHEN jim_FEAT.Density IS NULL THEN jim_RUN.Density
ELSE jim_FEAT.Density
END InsulationDensity
FROM JRtePathGenPart jpgp
JOIN XOwnsParts rop on rop.oiddestination = jpgp.oid
JOIN XPathGeneratedParts rpgp on rpgp.oiddestination = jpgp.oid
JOIN JRteInsulation jri_FEAT on jri_FEAT.oid = rpgp.oidorigin
JOIN JInsulationMaterial jim_FEAT on jim_FEAT.MaterialType =
jri_FEAT.InsulationMaterial
JOIN JRteInsulation jri_RUN on jri_RUN.oid = rop.oidorigin
JOIN JInsulationMaterial jim_RUN on jim_RUN.MaterialType =
jri_RUN.InsulationMaterial
WHERE jpgp.oid = ?
```

Piping Stress Analysis Insulation Thickness

Name: Piping Stress Analysis Insulation Thickness
Description: Insulation Thickness per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Insulation Thickness
SQL Query:

Piping Stress Analysis Material Grade

Name: Piping Stress Analysis Material Grade
Description: Material Grade Name per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: MaterialsGrade
SQL Query:

Piping Stress Analysis Operating Pressure

Name: Piping Stress Analysis Operating Pressure
Description: Operating Pressure per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Operating Maximum Pressure
SQL Query:

Piping Stress Analysis Operating Temperature

Name: Piping Stress Analysis Operating Temperature
Description: Operating Temperature per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Operating Maximum Temperature
SQL Query:

Piping Stress Analysis Test Pressure

Name: Piping Stress Analysis Test Pressure
Description: Test Pressure (max) per part, for export to stress analysis
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Testing Maximum Pressure
SQL Query:

Piping Stress Analysis Wall Thickness (port2)

Name: Piping Stress Analysis Wall Thickness (port2)
Description: Wall thickness per part, for export to stress analysis
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: WallThickness
SQL Query:

Piping Tie Point Occurrence Location X

Name: Piping Tie Point Occurrence Location X
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: X
SQL Query:

Piping Tie Point Occurrence Location Y

Name: Piping Tie Point Occurrence Location Y
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: X
SQL Query:

Piping Tie Point Occurrence Location Z

Name: Piping Tie Point Occurrence Location Z
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: X
SQL Query:

Piping ToolTip Nozzle Identification

Name: Piping ToolTip Nozzle Identification
Description: Example of a Label for a Nozzle
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: ParentName
SQL Query:

Piping ToolTip Pipe Component

Name: Piping ToolTip Pipe Component
Description: Example of a Label for PipeComponent
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CommodityType
SQL Query:

Piping ToolTip Pipe Feature

Name: Piping ToolTip Pipe Feature
Description: Example of a Label for PipeFeature
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Tag
SQL Query:

Piping ToolTip Pipe Line

Name: Piping ToolTip Pipe Line
Description: Example of a Label for PipeLine System
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SequenceNumber
SQL Query:

Piping ToolTip Pipe Weld

Name: Piping ToolTip Pipe Weld
Description: Example of a Label for PipeWeld
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Type
SQL Query:

Piping ToolTip Piping Connection

Name: Piping ToolTip Piping Connection
Description: Example of a Label for Piping Connection
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
Jan. 9, 2007 Modified query to better support thru-bolt connection
Name="Piping ToolTip Piping Connection"
Description="Example of a Label for Piping Connection"
RequiresFilter="No">
Progid="SP3DReportsQueryBuilder.SQLQuery"
Action=""
Arg="" />
Progid="SP3DRuntimeQuery.CQueryInterpreter"
Action=""
Arg="" />
Timeout="0">
select distinct
dc.ConnectionType ConnectionType_Index,
ct.shortstringvalue ConnectionType,
case
when dc.connectiontype > 2 then 0
```

```
else b.boltquantity
end Bolts_Quantity,
case
when dc.connectiontype > 2 then ' '
else b.shortmaterialdescription
end Bolts_Description
FROM jdistribconnection dc
JOIN cl_connectiontype ct ON ct.valueid = dc.connectiontype
LEFT JOIN ( Select xrcpo.oidorigin, rb.boltquantity,
jbolt.shortmaterialdescription
FROM XRelConnectionAndPartOcc xrcpo
JOIN jpartocc p ON p.oid = xrcpo.oiddestination
JOIN XRelConnectionAndPartOcc xrcpo2 ON xrcpo2.oiddestination = p.oid
JOIN jdistribconnection dc2 ON dc2.oid = xrcpo2.oidorigin
JOIN XGeneratesConnectionItems xgci ON xgci.oidorigin = dc2.oid
JOIN jrtebolt rb ON rb.oid = xgci.oiddestination
JOIN XImpliedMatingParts ximp ON ximp.oidorigin = rb.oid
JOIN jbolt ON jbolt.oid = ximp.oiddestination
) b on b.oidorigin = dc.oid
WHERE dc.oid = ?
Timeout="0">
select distinct
dc.ConnectionType ConnectionType_Index,
ct.shortstringvalue ConnectionType,
case
when dc.connectiontype > 2 then 0
else b.boltquantity
end Bolts_Quantity,
case
when dc.connectiontype > 2 then cast(' ' as nvarchar2(255))
else b.shortmaterialdescription
end Bolts_Description
FROM jdistribconnection dc
JOIN cl_connectiontype ct ON ct.valueid = dc.connectiontype
LEFT JOIN ( Select xrcpo.oidorigin, rb.boltquantity,
jbolt.shortmaterialdescription
FROM XRelConnectionAndPartOcc xrcpo
JOIN jpartocc p ON p.oid = xrcpo.oiddestination
JOIN XRelConnectionAndPartOcc xrcpo2 ON xrcpo2.oiddestination = p.oid
JOIN jdistribconnection dc2 ON dc2.oid = xrcpo2.oidorigin
JOIN XGeneratesConnectionItems xgci ON xgci.oidorigin = dc2.oid
JOIN jrtebolt rb ON rb.oid = xgci.oiddestination
JOIN XImpliedMatingParts ximp ON ximp.oidorigin = rb.oid
JOIN jbolt ON jbolt.oid = ximp.oiddestination
) b on b.oidorigin = dc.oid
WHERE dc.oid = hextoraw(?)
Name="Piping ToolTip Piping Connection"
Site="User"
Path="Piping ToolTip Piping Connection.rqp" />
```

Piping Valve Operator Type

Name: Piping Valve Operator Type
Description: Valve Operator type
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT vot.Shortstringvalue as ValveOperatorType
FROM JDPipeComponent2 pc2
JOIN CL_ValveOperatorType vot ON vot.valueid=pc2.ValveOperatorType
JOIN Xmadefrom rmf ON (rmf.oiddestination = pc2.oid)
WHERE rmf.oidorigin = ?
```

Piping Valves NPD with Unit Primary

Name: Piping Valves NPD with Unit Primary
Description: NPD with units for primary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Valves NPD with Unit Secondary

Name: Piping Valves NPD with Unit Secondary
Description: NPD with units for secondary size
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Piping Weight

Name: Piping Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Piping Weld NPD with Unit Primary

\Name: Piping Weld NPD with Unit Primary
Description: NPD with units for primary size
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
SELECT pco.PrimarySize,
pco.PriSizeNPDUnits
FROM XMadeFrom rmf
JOIN JDPipeComponent pco ON (pco.Oid = rmf.OidDestination)
WHERE rmf.OidOrigin = ?
```

Reinforcing Pads Label

Name: Reinforcing Pads Label
Description: Material Description Label for Reinforcing Pads
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[End Preparation 1]' As EndPreparation1, '[End Preparation 2]' As
EndPreparation2,
'[Schedule Thickness 1]' As ScheduleThickness1, '[Schedule Thickness
```

```
2]' As ScheduleThickness2,
Mfd.SurfacePreparation_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue,
'[425]' As RpadWidthByThick from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
Select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[End Preparation 1]' As EndPreparation1, '[End Preparation 2]' As
EndPreparation2,
'[Schedule Thickness 1]' As ScheduleThickness1, '[Schedule Thickness
2]' As ScheduleThickness2,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue,
'[425]' As RpadWidthByThick
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
= ClSPre.VALUEID)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Stock Instruments Label

Name: Stock Instruments Label
Description: Example of a Label for PipeComponent
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.SurfacePreparation_ShortValue,
Pcom.LiningMaterial_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
Left OUTER join dbo.JUAManufacturerData_CL Mfd ON (pcom.oid = Mfd.oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
Left OUTER join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
= ClSPre.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
```

```
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Stock Piping Specialties Label

Name: Stock Piping Specialties Label
Description: Material Description Label for Stock Piping Specialties
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.SurfacePreparation_ShortValue,
Pcom.LiningMaterial_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
Left OUTER join dbo.JUAManufacturerData_CL Mfd ON (pcom.oid = Mfd.oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
Left OUTER join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
```

```
= ClSPre.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on
(Mfd.MiscRequisitionClassification = ClMRC.VALUEID)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Stud Bolts Machine Bolts Cap Screws and Jack Screws Label

Name: Stud Bolts Machine Bolts Cap Screws and Jack Screws Label
Description: Material Description Label for Stud Bolts Machine Bolts Cap Screws and Jack Screws
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:
```
Select Bol.BoltType_ShortValue,
Rteb.BoltQuantity,
Rteb.Diameter,
Rteb.RoundedLength,
Bol.GeometricIndustryStandard_ShortValue as GeomIndStandard_ShortValue,
JGMCD.Manufacturer_ShortValue,
Bol.MaterialsGrade_ShortValue,
Bol.CoatingType_ShortValue from dbo.JBolt_CL Bol
join XImpliedMatingParts Imp ON (BOL.oid = Imp.oiddestination)
join dbo.JRteBolt_CL Rteb ON (Imp.oidOrigin = Rteb.Oid)
join dbo.JGenericMaterialControlData_CL JGMCD on
(JGMCD.ContractorCommoditycode = Bol.IndustryCommoditycode)
where Imp.oidOrigin= ?
Select ClBT.SHORTSTRINGVALUE as BoltType_ShortValue,
Rteb.BoltQuantity,
Rteb.Diameter,
Rteb.RoundedLength,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE as Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClCoaT.SHORTSTRINGVALUE as CoatingType_ShortValue
from CL_BoltType ClBT
join JBolt Bol on (ClBT.VALUEID = Bol.BoltType)
join XImpliedMatingParts Imp ON (Bol.oid = Imp.oiddestination)
join JRteBolt Rteb ON (Imp.oidOrigin = Rteb.Oid)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
Bol.GeometricIndustryStandard)
join JGenericMaterialControlData JGMCD on
(JGMCD.ContractorCommoditycode = Bol.IndustryCommoditycode)
```

```
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = JGMCD.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Bol.MaterialsGrade)
join CL_CoatingType ClCoaT on (ClCoaT.VALUEID = Bol.CoatingType)
where Imp.oidOrigin= ?
```

Tubing and Hose Label

Name: Tubing and Hose Label
Description: Example of a Label for PipeComponent
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.SurfacePreparation_ShortValue, Pcom.LiningMaterial_ShortValue,
Pcom.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue, Pcom2.Manufacturer_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
Select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClSPre.SHORTSTRINGVALUE as SurfacePreparation_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE As Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
Mfd.ManufacturingMethod,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
```

```
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
Left OUTER join CL_SURFACEPREPARATION ClSPre ON (Mfd.SurfacePreparation
= ClSPre.VALUEID)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = Pcom2.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
Left OUTER join CL_MISCREQUISITIONCLASSIFICATI ClMRC on (ClMRC.VALUEID
= Mfd.MiscRequisitionClassification)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Valves Label

Name: Valves Label
Description: Material Description Label for Valves
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
select Pcom.CommodityType_LongValue,
dbo.REPORTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS
'NPD1',
'in' AS 'NPDUnitType1',
'Piping' AS 'Category',
NULL AS 'BoltDiameter',
dbo.REPORTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS
'NPD2',
'in' AS 'NPDUnitType2',
'[Ports]' AS PortsInfo,
Mfd.ValveTrim_ShortValue,
Mfd.ValveManufacturer_ShortValue, Mfd.ValveModelNumber_ShortValue,
Pcom2.GeometricIndustryStandard_ShortValue as
GeomIndStandard_ShortValue,
Pcom.MaterialsGrade_ShortValue,
Mfd.MiscRequisitionClassification_ShortValue as
MiscReqClassfn_ShortValue,
Pcom.LiningMaterial_ShortValue from dbo.JDPipeComponent_CL Pcom
join dbo.JUAManufacturerData_CL Mfd ON (Pcom.Oid = Mfd.Oid)
join dbo.JDPipeComponent2_CL Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
select ClPco.LONGSTRINGVALUE as CommodityType_LongValue,
RPTConvertNPD('in',Pcom.PriSizeNPDUnits, Pcom.PrimarySize) AS NPD1,
'in' AS NPDUnitType1,
'Piping' AS Category,
NULL AS BoltDiameter,
RPTConvertNPD('in',Pcom.SecSizeNPDUnits, Pcom.SecondarySize) AS NPD2,
```

```
'in' AS NPDUnitType2,
'[Ports]' AS PortsInfo,
ClVTr.SHORTSTRINGVALUE as ValveTrim_ShortValue,
ClVMf.SHORTSTRINGVALUE as ValveManufacturer_ShortValue,
ClVMN.SHORTSTRINGVALUE as ValveModelNumber_ShortValue,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClMRC.SHORTSTRINGVALUE as MiscReqClassfn_ShortValue,
ClLM.SHORTSTRINGVALUE as LiningMaterial_ShortValue
from CL_PIPINGCOMMODITYTYPE ClPco
join JDPIPECOMPONENT Pcom on (ClPco.VALUEID = Pcom.COMMODITYTYPE)
join JUAManufacturerData Mfd ON (Pcom.Oid = Mfd.Oid)
join CL_VALVETRIM ClVTr on (ClVTr.VALUEID = Mfd.ValveTrim)
join CL_VALVEMANUFACTURER ClVMf on (ClVMf.VALUEID =
Mfd.ValveManufacturer)
join CL_VALVEMODELNUMBER ClVMN on (ClVMN.VALUEID =
Mfd.ValveModelNumber)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
pcom.GeometricIndustryStandard)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = Pcom.MaterialsGrade)
join CL_MISCREQUISITIONCLASSIFICATI ClMRC on (ClMRC.VALUEID =
Mfd.MiscRequisitionClassification)
join CL_LININGMATERIAL ClLM on (ClLM.VALUEID = Pcom.LiningMaterial)
join JDPipeComponent2 Pcom2 ON (Pcom.Oid = Pcom2.Oid)
join xmadefrom rmf ON (pcom.oid = rmf.oiddestination)
where rmf.oidorigin = ?
```

Washers Label

Name: Washers Label
Description: Material Description Label for Washers
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

```
Select JWa.WasherType_ShortValue,
RteW.WasherQuantity,
Wsf.BoltDiameter,
JWa.WasherThickness,
JWa.GeometricIndustryStandard_ShortValue as GeomIndStandard_ShortValue,
JGMCD.Manufacturer_ShortValue,
JWa.MaterialsGrade,
JWa.CoatingType from dbo.JWasher_CL JWa
JOIN XImpliedMatingParts Imp ON (JWa.oid = Imp.oiddestination)
JOIN dbo.JRteWasher RteW ON (RteW.Oid = Imp.oidOrigin)
JOIN JWasherSelectionFilter Wsf ON (Wsf.ContractorCommoditycode =
JWa.IndustryCommoditycode)
JOIN JGenericMaterialControlData_CL JGMCD on
(JGMCD.ContractorCommoditycode = JWa.IndustryCommoditycode)
where Imp.oidOrigin= ?
```

```
select ClWT.SHORTSTRINGVALUE as WasherType_ShortValue,
RteW.WasherQuantity,
Wsf.BoltDiameter,
JWa.WasherThickness,
ClGIS.SHORTSTRINGVALUE as GeomIndStandard_ShortValue,
ClMfd.SHORTSTRINGVALUE as Manufacturer_ShortValue,
ClMGr.SHORTSTRINGVALUE as MaterialsGrade_ShortValue,
ClCoaT.SHORTSTRINGVALUE as CoatingType_ShortValue
from CL_WasherType ClWT
JOIN JWasher JWa on (ClWT.VALUEID = JWa.WasherType)
JOIN JRteWasher RteW ON (RteW.Oid = JWa.Oid)
join JWasherSelectionFilter Wsf ON (Wsf.ContractorCommoditycode =
JWa.IndustryCommoditycode)
join CL_GEOMETRICINDUSTRYSTANDARD ClGIS on (ClGIS.VALUEID=
GeometricIndustryStandard)
join JGenericMaterialControlData JGMCD on
(JGMCD.ContractorCommoditycode = JWa.IndustryCommoditycode)
join CL_MANUFACTURER ClMfd on (ClMfd.VALUEID = JGMCD.Manufacturer)
join CL_MATERIALSGRADE ClMGr on (ClMGr.VALUEID = JWa.MaterialsGrade)
join CL_CoatingType ClCoaT on (ClCoaT.VALUEID = JWa.CoatingType)
join XImpliedMatingParts Imp ON (Jwa.oid = Imp.oiddestination)
where Imp.oidOrigin= ?
```

Weld Joint Type

Name: Weld Joint Type
Description: Maps the port end preparation to a more general classification.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Work Breakdown Structure Path

Name: Work Breakdown Structure Path
Description: Work Breakdown Structure Path
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

SmartPlant Review Labels

The following SmartPlant Review Labels are delivered with the software.

Topics

SPR CableTray Data

Name: SPR CableTray Data
Description: SPR CableTray Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Cableway Data

Name: SPR Cableway Data
Description: SPR Cableway Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Conduit Data

Name: SPR Conduit Data
Description: SPR Conduit Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Equipment Data

Name: SPR Equipment Data
Description: SPR Equipment Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Equipment Foundation Data

Name: SPR Equipment Foundation Data
Description: SPR Equipment Foundation Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Fireproofing Data

Name: SPR Fireproofing Data
Description: SPR Fireproofing Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Footing Component Data

Name: SPR Footing Component Data
Description: SPR Footing Component Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Footing Data

Name: SPR Footing Data
Description: SPR Footing Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Handrail Data

Name: SPR Handrail Data
Description: SPR Handrail Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR HVAC Data

Name: SPR HVAC Data
Description: SPR HVAC Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Ladder Data

Name: SPR Ladder Data
Description: SPR Ladder Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Marine Plate Data

Name: SPR Marine Data
Description: SPR Marine Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Marine Profile Data

Name: SPR Marine Profile Data
Description: SPR Marine Profile Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Member Part Data

Name: SPR Member Part Data
Description: SPR Member Part Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Pipe Data

Name: SPR Pipe Data
Description: SPR Pipe Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Pipe Nozzle Data

Name: SPR Pipe Nozzle Data
Description: SPR Pipe Nozzle Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Piping Clamp Data

Name: SPR Piping Clamp Data
Description: SPR Piping Clamp Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Plate Data

Name: SPR Plate Data
Description: SPR Plate Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Cable Tray Data

Name: SPR Reference3D Cable Tray Data
Description: SPR Reference3D Cable Tray Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Conduit Data

Name: SPR Reference3D Conduit Data
Description: SPR Reference3D Conduit Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Equipment Data

Name: SPR Reference3D Equipment Data
Description: SPR Reference3D Equipment Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Generic Data

Name: SPR Reference3D Generic Data
Description: SPR Reference3D Generic Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Handrail Data

Name: SPR Reference3D Handrail Data
Description: SPR Reference3D Handrail Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D HVAC Data

Name: SPR Reference3D HVAC Data
Description: SPR Reference3D HVAC Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Ladder Data

Name: SPR Reference3D Ladder Data
Description: SPR Reference3D Ladder Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Marine Plate Data

Name: SPR Reference3D Marine Plate Data
Description: SPR Reference3D Marine Plate Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Marine Profile Data

Name: SPR Reference3D Marine Profile Data
Description: SPR Reference3D Marine Profile Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Member Part Data

Name: SPR Reference3D Member Part Data
Description: SPR Reference3D Member Part Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Pipe Nozzle Data

Name: SPR Reference3D Pipe Nozzle Data
Description: SPR Reference3D Pipe Nozzle Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Piping Data

Name: SPR Reference3D Piping Data
Description: SPR Reference3D Piping Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Slab Data

Name: SPR Reference3D Slab Data
Description: SPR Reference3D Slab Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Stair Data

Name: SPR Reference3D Stair Data
Description: SPR Reference3D Stair Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Reference3D Wall Data

Name: SPR Reference3D Wall Data
Description: SPR Reference3D Wall Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Slab Data

Name: SPR Slab Data
Description: SPR Slab Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Space Data

Name: SPR Space Data
Description: SPR Space Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Stair Data

Name: SPR Stair Data
Description: SPR Stair Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Support Data

Name: SPR Support Data
Description: SPR Support Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Wall Data

Name: SPR Wall Data
Description: SPR Wall Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

SPR Weld Data

Name: SPR Weld Data
Description: SPR Weld Data
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Component Name

SQL Query:

Structural Manufacturing Labels

The following structural manufacturing labels are delivered with the software.

Tool Tip Labels

STRMFGAssemblyMarginToolTip

Name: STRMFGAssemblyMarginToolTip
Description: Sample ToolTip for StrMfg Assembly Margin object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

STRMFGConstMarginToolTip

Name: STRMFGConstMarginToolTip
Description: Sample ToolTip for StrMfg ConstMargin
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: MarginValue
SQL Query:

STRMFGMarkingLineToolTip

Name: STRMFGMarkingLineToolTip
Description: Sample ToolTip for StrMfg Marking Line object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

STRMFGMfgPlatePartToolTip

Name: STRMFGMfgPlatePartToolTip
Description: Sample ToolTip for StrMfg MfgPlatePart
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CommonPartName
SQL Query:

STRMFGMfgProfilePartToolTip

Name: STRMFGMfgProfilePartToolTip
Description: Sample ToolTip for StrMfg MfgProfilePart
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Dry Weight
SQL Query:

STRMFGObliqueMarginToolTip

Name: STRMFGObliqueMarginToolTip
Description: Sample ToolTip for Oblique Margin object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

STRMFGPinJigToolTip

Name: STRMFGPinJigToolTip
Description: Pin Jig Tooltip
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name_Jig
SQL Query:

STRMFGScalingShrToolTip

Name: STRMFGScalingShrToolTip
Description: Sample ToolTip for StrMfg Scaling Shrinkage Object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

STRMFGTemplateSetToolTip

Name: STRMFGTemplateSetToolTip
Description: Sample ToolTip for StrMfg TemplateSet object
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Plate Part Name
SQL Query:

Structure Labels

The following structure labels are delivered with the software.

Topics

Structure Designed Member Computed Area

Name: Structure Designed Member Computed Area
Description: Area of the designed member.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Width, Thickness
SQL Query:

Structure Designed Member Computed SurfaceArea

Name: Structure Designed Member Computed SurfaceArea
Description: Surface area of designed member.
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Perimeter, PlateLength
SQL Query:

Structure Hanger Support Occurrence Location

Name: Structure Hanger Support Occurrence Location
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Z
Y
X
SQL Query:

Structure Icarus Open Steel Distributed Load per Level

Name: Structure Icarus Open Steel Distributed Load per Level
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DistributedLoadPerLevel
SQL Query:

Structure Icarus Open Steel Slab Thickness

Name: Structure Icarus Open Steel Slab Thickness
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SlabThickness
SQL Query:

Structure Icarus Pipe Rack Air Cooler Loading

Name: Structure Icarus Pipe Rack Air Cooler Loading
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: AirCoolerLoading
SQL Query:

Structure Icarus Pipe Rack Distributed Load per Level

Name: Structure Icarus Pipe Rack Distributed Load per Level
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DistributedLoadPerLevel
SQL Query:

Structure Icarus Pipe Rack Minimum Beam or Column Width

Name: Structure Icarus Pipe Rack Minimum Beam or Column Width
Description:
Type: VB
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: MinimumBeamorColumnWidth
SQL Query:

Structure Linear Member Computed SurfaceArea

Name: Structure Linear Member Computed SurfaceArea
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CutLength
Perimeter
SQL Query:

Structure Linear Member Cut Length

Name: Structure Linear Member Cut Length
Description: CutLength
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: CutLength
SQL Query:

Structure Linear Member Dry Weight

Name: Structure Linear Member Dry Weight
Description: Dry weight label definition
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DryWeight
SQL Query:

Structure Linear Member Length

Name: Structure Linear Member Length
Description: Length
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Structure Linear Member Surface Area

Name: Structure Linear Member Surface Area
Description: Surface area
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SurfaceArea
SQL Query:
```
SELECT jsa.SurfaceArea AS SurfaceArea
FROM JSurfaceArea jsa
WHERE jsa.oid = ?
```

Structure Linear Member Total Surface Area

Name: Structure Linear Member Total Surface Area
Description: Surface area
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: TotalSurfaceArea
SQL Query:
```
SELECT jsa.SurfaceArea AS TotalSurfaceArea
FROM JSurfaceArea jsa
WHERE jsa.oid = ?
```

Structure Linear Member Weight

Name: Structure Linear Member Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Structure Member Length

Name: Structure Member Length
Description: Length
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:
```
SELECT jrpo.Length AS Length
FROM JRteStockPartOccur jrpo
```

Structure Member Weight

Name: Structure Member Weight
Description: Dry weight
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Weight
SQL Query:

Structure Slab Dry Weight

Name: Structure Slab Dry Weight
Description: Dry weight label definition
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: DryWeight
SQL Query:

Structure Slab Surface Area

Name: Structure Slab Surface Area
Description: Surface area
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SurfaceArea
SQL Query:

Structure Slab Thickness

Name: Structure Slab Thickness
Description: Thickness
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Thickness
SQL Query:
```
SELECT coalesce(s.Thickness, slt.Thickness) Thickness
FROM SPSSlabEntity se
LEFT JOIN XLayerComposition rlc ON rlc.oidorigin = se.oid
JOIN JUASlabLayerType s ON s.oid = rlc.oiddestination /* layer in the
model */
LEFT JOIN XSlabLayerTypeReferenceRln rslt ON
rslt.oidorigin=rlc.oiddestination
JOIN JUASlabLayerType slt ON slt.oid= rslt.oiddestination /* layer in
the catalog */
WHERE se.oid = ?
```

Structure Slab Volume

Name: Structure Slab Volume
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NetVolume
SQL Query:

Structure ToolTip Boundary Condition

Name: Structure ToolTip Boundary Condition
Description: Example of Format used for labels on instantiated objects
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: ZRotation
YRotation
XRotation
ZDisplacement
YDisplacement
XDisplacement
SQL Query:

Structure ToolTip for AssemblyConnection

Name: Structure ToolTip for AssemblyConnection
Description: Example format Tooltip for AssemblyConnections
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Structure ToolTip for Eqp Foundations

Name: Structure ToolTip for Equipment Foundation
Description: Tooltip for EqpFoundation format
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SurfaceArea
Volume
SQL Query:

Structure ToolTip for Footings

Name: Structure ToolTip for Footings
Description: Tooltip for Footings format
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: SurfaceArea
Volume
SQL Query:

Structure ToolTip for FrameConnections

Name: Structure ToolTip for FrameConnections
Description: Format for Tooltip for FrameConnections
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Structure ToolTip for Handrails

Name: Structure ToolTip for Handrails
Description: Tooltip for Handrails format
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Length
SQL Query:

Structure ToolTip for Ladders

Name: Structure ToolTip for Ladders
Description: Tooltip for Ladders
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Height
Span
SQL Query:

Structure ToolTip for MemberParts

Name: Structure ToolTip for MemberParts
Description: Tooltip for Member Parts
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Depth
Width
CutLength
SQL Query:

Structure ToolTip for MemberSystem Location

Name: Structure ToolTip for MemberSystem Location
Description: Format of Tooltip for MemberSystem Location
Type: SQL
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: z2
z1
Length
SQL Query:
```
Name="MemberSystem"
Description="Query for ToolTip for MemberSystem Location"
RequiresFilter="No">
Progid="SP3DReportsQueryBuilder.SQLQuery"
Action=""
Arg="" />
Progid="SP3DRuntimeQuery.CQueryInterpreter"
Action=""
Arg="" />
Timeout="0">
Select
jln.length As Length,
jln.rootpointZ As z1,
jln.endZ As z2,
jname1.itemname As SystemName
From SPSMemberSystem mems
Join Jline jln on (jln.oid = mems.oid)
Join XSystemTree xtree on (xtree.oidDestination = mems.oid)
Join JNamedItem jname1 on (jname1.oid = xtree.oidOrigin)
WHERE mems.oid = ?
Name="ByOID"
Site="User"
Path="Structure ToolTip for MemberSystem Location.rqp" />
```

Structure ToolTip for MemberSystems

Name: Structure ToolTip for MemberSystems
Description: Tooltip for MemberSystems
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Structure ToolTip for Slabs

Name: Structure ToolTip for Slabs
Description: Tooltip for Slabs
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties:
SQL Query:

Structure ToolTip for Stairs

Name: Structure ToolTip for Stairs
Description: Tooltip for Stair
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Height
Span
Length
SQL Query:

Structure ToolTip Grid Elevation Plane

Name: Structure ToolTip Grid Elevation Plane
Description: Example of a Label for Grid Elevation Plane
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Elevation
SQL Query:

Structure ToolTip Grid Line

Name: Structure ToolTip Grid Line
Description: Example of a Label for Grid Line
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Structure ToolTip Structural Member

Name: Structure ToolTip Structural Member
Description: Example of a Label for Structural Member
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: Name
SQL Query:

Structure Slab Volume

Name: Structure Slab Volume
Description:
Type: COM
Is Recursive: No
Conditional Formatting: No
Design Time Prog ID: SP3DLabelFormatDesigner.RTFLabel
Run Time Prog ID: SP3DLabelsFormat.FormatLabel
Returned Properties: NetVolume
SQL Query:

Appendix: Edges

Smart 3D has a number of predefined edges that combine multiple relationships. These edges are virtual relationships that allow you to query objects that are not directly related. For example, Smart 3D delivers an edge called **Pipeline to Piping Parts**. The actual persisted relationships are between Pipeline to Pipe Run and Pipe Run to Piping Part. This edge allows you to directly query for all piping parts in a pipeline thus *jumping* the two relationships.

Edges make it possible to define filters for selection and style rules that query for properties on indirectly related objects. This makes label and report query definitions significantly simpler. Using edges eliminates the need to use SQL filters and SQL queries in labels and reports and also contributes to better performance.

An edge definition specifies the relationship from one interface to another interface. The edge loader tool loads edge definitions to, or deletes edge definitions from, the Smart 3D catalog schema database. An edge registry file is used to specify the edge definitions to load or delete.

You cannot directly modify an edge definition already loaded into the database. To update an edge definition in the database, you must delete the original edge definition from the database, create a new edge definition, and then load the new edge definition to the database.

A tool named **EdgeLoader** loads edges from XML files into a catalog schema. This tool is available from the eCustomer website (https://crmweb.intergraph.com/ecustomer_enu/). The following edges are available:

Route:

- FeatureToRunSpecification
- PipingConnItemToPipeline
- PipingConnItemToPiperun
- PipingConnItemToPipingPort
- PipingConnItemToRunSpecification
- NozzleToRun

Hangers:

- SupportToRun
- SupportToParentOfRun
- SupportToRoutePart

Structure:

- MemberPartToInsulationSpecification
- MemberPartToInsulationMaterial
- FoundationToEquipment

Grids:

- GridlineToCoordinateSystem

📝 **NOTES**

- As additional edges become available, they will be posted to the eCustomer website.

- If you require an edge that is not delivered, open an SR requesting that edge. Edges are delivered through eCustomer only, and all edges are available to all customers.

Edge Loader Dialog Box

Controls parameters for loading or deleting edge definitions from the Smart 3D catalog schema database.

Connection

Provider Type

Specifies the database provider. Select **MSSQL Server** or **Oracle**.

Server

Specifies the database server where the catalog database and catalog schema database reside.

Catalog Database

Specifies the catalog database for which to update the views after the loading processing completes. This box is activated when you select **Update Catalog Database View**.

Catalog Schema

Specifies the catalog schema database into which to load the edge definitions.

Update Catalog Database View

Updates the views of the catalog database that you select with edge definitions that are loaded or deleted when the loading processing completes.

Edge

Registry File

Specifies the full path to the edge registry file, EdgeEntry.xls.

Log File

Specifies the full path to a log file for the loading processing.

Load

Starts the loading processing.

Edge Registry File

Specifies the edge definitions to be loaded to or deleted from the Smart 3D catalog schema database. The file name is EdgeEntry.xls.

Edge Name – Specifies the name of an edge definition.

Package Name – Specifies the catalog package in the catalog schema database into which the edge definition is loaded. The default value is **UserDefinedPackage**. You should not change the package name.

Path – Specifies the full path to the edge definition file.

NOTES

- If an edge definition is to be loaded into the database, type **A** in the cell in Column A, preceding the **Edge Name**.

- If an edge definition is to be deleted from the database, type **D** in the cell in Column A, preceding the **Edge Name**.

- After the loading processing is complete. The **A** or **D** marks in Column A are kept so that you can know what edge definitions are in the database. Unless you change the marks, they are ignored in future loading processing.

A	Edge Name	Package Name	Path
Start			
D	Test1	UserDefinedPackage	E:\EdgeDefinition\test1.xml
A	Test2		E:\EdgeDefinition\test2.xml
End			

What do you want to do?

- *Run EdgeLoader* (on page)

- *Load edge definitions to the Smart 3D catalog schema database* (on page 959)

- *Update an edge definition in the Smart 3D catalog schema database* (on page 960)

- *Delete edge definitions from the Smart 3D catalog schema database* (on page 960)

Run EdgeLoader

EdgeLoader is available from the following eCustomer website and does not require installation.

https://crmweb.intergraph.com/ecustomer_enu/.

Ensure that the following are added to the PATH system variable before you run **EdgeLoader**:

- *[Product Folder]*\Core\Runtime

- *[Product Folder]*\GeometryTopology\Runtime

1. Double-click **EdgeLoader**.

   The Edge Loader dialog box displays.

Load edge definitions to the Smart 3D catalog schema database

1. Open the edge registry file, EdgeEntry.xls.

   NOTE You must be using Microsoft Excel 2007 or newer.

2. Create an entry for each edge definition. Specify the name of the edge definition, the catalog package in the catalog schema database into which the edge definition is loaded, and the complete path to the edge definition.

   NOTES

   - If there is already an entry for the edge definition, check the Column A cell preceding the **Edge Name**. If it reads **D**, then you can change it to **A** and verify that the **Package Name** information and the complete path to the edge definition file are correct. If it reads **A**, an edge definition of the same name is already in the database. You cannot load this edge definition unless you delete the edge definition of the same name from the database.

   - User-defined edge definitions can only be loaded into the default **UserDefinedPackage** catalog package.

   TIP To delete edge definitions from the database, type **D** in the Column A cell preceding the **Edge Name** for each edge definition to delete. The **Edge Loader** can process loading and deleting edge definitions at the same time.

3. Save your changes, and close the edge registry file.

4. Double-click **EdgeLoader**.

   The Edge Loader dialog box displays.

5. In the **Provider Type** box, specify the database provider. You can select **MSSQL Server** or **Oracle**.

6. In the **Server** box, specify the database server where the catalog database and catalog schema database reside.

7. In the **Catalog Schema** box, specify the catalog schema database into which to load the edge definitions.

8. If you want to update the catalog database views with the edge definitions that are loaded after the loading processing completes, select **Update Catalog Database View**, and specify the catalog database in the **Catalog Database** box.

   ★ **IMPORTANT** After loading the edges, you must update the Model views and regenerate the Reports database. You can use the **View Generator** utility to update the Model views. For more information, see the *Project Management User's Guide*.

9. In the **Registry File** box, specify the complete path to the edge registry file, EdgeEntry.xls. You can click **Browse** ⊡ to browse to the file location.

10. In the **Log File** box, specify a log file for tracking the loading processing.

11. Click **Load**.

   The software loads the edge definitions to the Smart 3D catalog schema database.

Update an edge definition in the Smart 3D catalog schema database

You cannot directly modify an edge definition already loaded into the database. To update an edge definition in the database, you must delete the original edge definition from the database, create a new edge definition, and then load the new edge definition to the database.

For more information, see:

- *Delete edge definitions from the Smart 3D catalog schema database* (on page 960)
- *Load edge definitions to the Smart 3D catalog schema database* (on page 959)

Delete edge definitions from the Smart 3D catalog schema database

1. Open the edge registry file, EdgeEntry.xls.

2. For each edge definition to be deleted from the database, type **D** in the Column A cell preceding the **Edge Name**.

3. Save your changes, and close the edge registry file.

4. Double-click **EdgeLoader**.

   *The **Edge Loader** dialog box displays.*

5. In the **Provider Type** box, specify the database provider. You can select **MSSQL Server** or **Oracle**.

6. In the **Server** box, specify the database server where the catalog database and catalog schema database reside.

7. In the **Catalog Schema** box, specify the catalog schema database into which to load the edge definitions.

8. If you want to update the catalog database views with the edge definitions that are loaded after the loading processing completes, select **Update Catalog Database View**, and specify the catalog database in the **Catalog Database** box.

★ **IMPORTANT** After loading the edges, you must update the Model views and regenerate the Reports database. You can use the **View Generator** utility to update the Model views. For more information, see the *Project Management User's Guide*.

9. In the **Registry File** box, specify the complete path to the edge registry file, EdgeEntry.xls. You can click **Browse** ⊡ to browse to the file location.

10. In the **Log File** box, specify a log file for tracking the loading processing.

11. Click **Load**.

    The software deletes the edge definitions from the Smart 3D catalog schema database.

Appendix: Property Dialog Boxes

This appendix contains reference information for all the property dialog boxes in the **Catalog** task.

Reference Data Properties Dialog Box

Allows you to view standard and custom properties for a classification, part class or object in the Catalog database. The tabs and properties that appear on this dialog box vary depending on the object you selected before you opened the dialog box.

Any or all of the following tabs can appear on this dialog box:

Definition Tab (Reference Data Properties Dialog Box) (on page 963)
Material Control Data Tab (Reference Data Properties Dialog Box) (on page 964)
Connections Tab (Reference Data Properties Dialog Box) (on page 964)
Configuration Tab (Reference Data Properties Dialog Box)
Occurrence Tab (New Class Dialog Box)

Defines the user defined interfaces, properties, and mapped parameters for the new part class.

Category

Select the Category that contains the user interfaces to add to the part class. If the selected Category does not contain interfaces, nothing appears in the grid.

Interface Name

Select the user interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab appear in gray. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the **General** tab. You need to map the symbol parameter name to the interface property that drives the parameter.

Delete

Removes the selected interface from the grid.

See Also
Properties Command (on page 61)
Viewing Item Properties (on page 40)
View Item Properties (on page 61)

Definition Tab (Reference Data Properties Dialog Box)

Displays information about the selected classification, part class, or object - the properties and their values as defined in the reference data.

This tab is always available; however, the properties that appear on it vary depending on whether you select a part class or classification.

Property

Displays the name of the property as defined in the reference data.

Value

Displays the value of the corresponding property.

Interface Name

Select the interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab display grayed out. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the **General** tab. You need to map the symbol parameter name to the interface property that drives the parameter.

See Also
Properties Command (on page 61)
Viewing Item Properties (on page 40)
Reference Data Properties Dialog Box (on page 962)

Material Control Data Tab (Reference Data Properties Dialog Box)

Displays material control data for the selected piping component. This tab appears only when you select an item that belongs to one of the Piping Component part classes.

For information about material control data, see *Piping Commodity Material Control Data* (on page 356) and *Valve Operator Material Control Data* (on page 501).

Property

Displays the name of the property as defined in the reference data.

Value

Displays the value of the corresponding property.

See Also
Properties Command (on page 61)
Viewing Item Properties (on page 40)
Reference Data Properties Dialog Box (on page 962)

Connections Tab (Reference Data Properties Dialog Box)

Displays the connection information for the selected part class or object - the properties and their values as defined in the reference data. For more information about the information defined in the reference data, see the *Reference Data Guide*, accessible from **Help > Printable Guides**.

Connector

Select the connector for which you want to view properties.

Property

Displays the name of the property as defined in the reference data.

Value

Displays the string, number, or other information stored in the database for the associated property.

See Also
Properties Command (on page 61)
Viewing Item Properties (on page 40)
Reference Data Properties Dialog Box (on page 962)

Configuration Tab

Displays the creation, modification, and status information about an object.

Model

Displays the name of the model. You cannot change this value.

Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

NOTE The **Transfer** option does not apply to the filters and surface style rules.

Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

NOTE You can only edit or manipulate an object with a status of **Working**.

Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

Date Created

Specifies the creation date of the object.

Created by

Specifies the name of the person who created the object.

Date Last Modified

Specifies the date when the object was last modified.

Last Modified by

Specifies the name of the person who last modified the object.

Model Name

Specifies the reference 3D model name to which the object belongs. This option is available only for a reference 3D object.

File Name

Displays the source file name of the Reference 3D model. This option is available only for a Reference 3D object.

Appendix: Dialog Boxes

This appendix contains reference information for dialog boxes in the **Catalog** task.

New Class Dialog Box

Used to define the properties of a new part class. The dialog box has tabs for defining the required information.
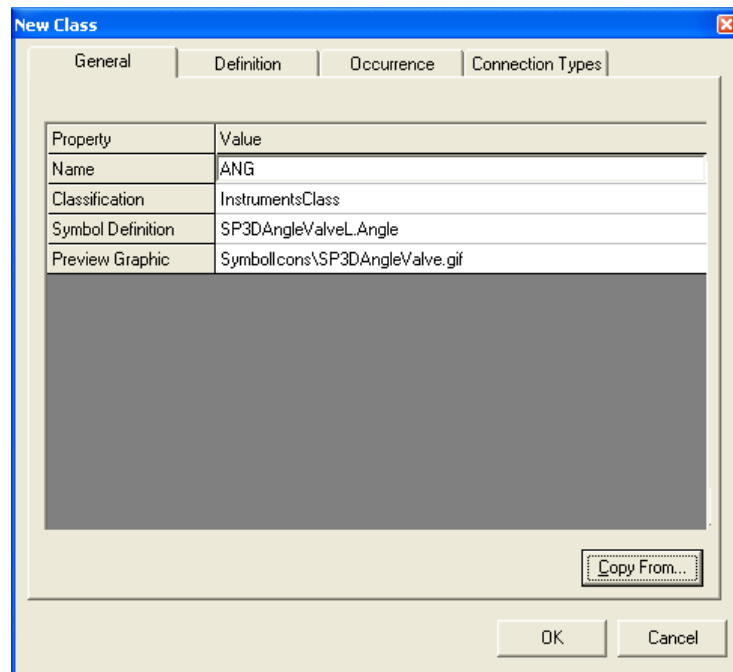
See Also
General Tab (New Class Dialog Box) (on page 52)
Definition Tab (New Class Dialog Box) (on page 54)
Occurrence Tab (New Class Dialog Box) (on page 55)
Connections Tab (New Class Dialog Box) (on page 55)

General Tab (New Class Dialog Box)

Defines the name, classification, symbol definition, and preview graphic for the new part class.

Name

Specify a unique name for the new class to identify the part class in the catalog schema. If you are using Microsoft SQL server, the part class name cannot exceed 31 characters. If you are using an Oracle database, the maximum number of characters is 23. Do not use special characters such as spaces < > . - ! ? + ' % , ; | & ~ * / \ $ in the names of part classes.

Display Name

Specify a name to use in the tree view for the part class.

Classification

Select the part classification. Part classifications define the minimum required interfaces for the new part class.

The part classifications that are available to select from are defined in the **Part Class Types** select list. You can edit that select list to include additional part classifications, if needed. The software suggests a default classification based on the current node selection in the tree view. In some cases, such as under the Equipment node, the software will not be able to default this option.

Symbol Definition

Specify the symbol or SmartAssembly ProgID that represents the new part class.

If you are using a custom symbol, you need to get the symbol definition name from the person who created the symbol. The symbol definition that you need to enter here is indicated by the red arrows.

Preview Graphic

Specify the .bmp, .jpg, or .gif graphic to display when a user clicks **Preview** 🗔 on the

ribbon.

If you are using a delivered symbol, the preview graphic name is usually the same as the symbol's ProgID name up to the period. For example, if the symbol ProgID is SP3DReturn.CReturn, then the preview graphic is SP3DReturn.gif.

If you are using a custom symbol, the graphic must be in the [ProdcutFolder]\SharedContent\SymbolIcons folder. We recommend that you use the same naming convention as the delivered symbols to limit confusion.

Codebase

Specify the symbol's cabinet file name (.CAB) located in the symbols share on the reference data server. An example of what to enter in the Codebase box is:

%CAB_SERVER%\CABs\SP3DReturn.CAB

★ **IMPORTANT** Enter the text %CAB_SERVER% literally; do not replace it with a server name. The software replaces the %CAB_SERVER% variable with your reference data server name and SharedContent share. For example, %CAB_SERVER%\CABS\SP3DReturn.CAB becomes [Product Folder]\SharedContent\CABs\SP3DReturn.CAB. In this example, you would have to create the folder named CABs on your SharedContent.

When a user on a client computer places the symbol for this part class, one of the following happens:

- If the symbol is a new symbol to that client computer, the software automatically pulls to the client computer the dll in the CAB file on the server, and then automatically registers the dll on the client computer.

- If the symbol dll already exists on the client computer, the software compares the version number of the dll on the client computer with the version number of the CAB file on the server. If the dll in the CAB file is newer, the software automatically pulls to the client computer the newer dll in the CAB file, and then automatically registers the dll on the client computer.

For more information about creating symbol packages (.CAB files), see the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

Copy From

Click to use an existing part class as the basis for the new part class. All of the existing part class information, classification, symbol definition, and symbol occurrence information in copied into the dialog box.

Definition Tab (New Class Dialog Box)

Defines the interfaces, properties, and mapped parameters for the new part class.

Category

Select the Category that contains the interfaces to add to the part class. If the selected Category does not contain interfaces, nothing appears in the grid.

Interface Name

Select the interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab display grayed out. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the **General** tab. You need to map the symbol parameter name to the interface property that drives the parameter.

Delete

Removes the selected interface from the grid.

Occurrence Tab (New Class Dialog Box)

Defines the user defined interfaces, properties, and mapped parameters for the new part class.

Category

Select the Category that contains the user interfaces to add to the part class. If the selected Category does not contain interfaces, nothing appears in the grid.

Interface Name

Select the user interfaces to add to the part class. Interfaces required by the **Classification** that you selected on the **General** tab appear in gray. You cannot remove the required interfaces. All properties belonging to the interface are available in the corresponding **Property Name** box.

Property Name

Displays all properties for the new part class. After selecting an interface in the **Interface Name** box, all the properties for that interface display here. If, however, you know the name of the property, but not the parent interface, you can select the property name in the blank row. All interfaces that have that property are made available in the corresponding **Interface Name** box. Then, select the correct parent interface.

Parameter Name

Displays the parameters defined in the symbol (or the SmartAssembly) defined on the

General tab. You need to map the symbol parameter name to the interface property that drives the parameter.

Delete

Removes the selected interface from the grid.

Connections Tab (New Class Dialog Box)

Defines the port connections types for the new part class.

Index

Displays the index number of the connection port.

Type

Select the type of connection port. You might need to refer to the symbol code to find out how many ports there are.

Delete

Removes the selected connection type from the grid.

New Select List Dialog Box

Sets options for defining a new select list.

Select list name

Type a name for the new select list.

Dependent select list name

Specify the select list on which the new select list is dependent. This option is only required if you are creating a hierarchical select list; otherwise, you can leave this value blank.

Add Select List Value Dialog Box

Sets options for adding a new value to an existing select list. The **Add Select List Value** dialog box only displays when you click **Add Select List Value** in a select list drop-down list. For example, in the editable grid where one of the columns requires a select list value, a combo box appears when you click in a cell in that column.
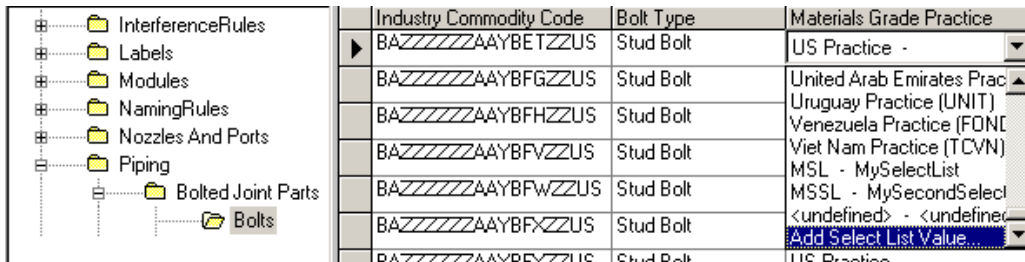
This feature allows you to add select list values in the grid while you are editing specification data.

Select list name

Displays the name of the select list to be extended. The value is read-only.

Long description

Type an extended description that identifies the select list value, not to exceed 256 characters. The long description appears on requisitions or other reports.

Short description

Type an abbreviated description that identifies the select list value, not to exceed 256 characters. The short description appears in the drop-down list when you select a select list value or when you see the select list value on the **Property** dialog box for an object in the model.

Select list number

Type an integer that uniquely identifies the select list value within the Catalog. Select list numbers must be unique within a select list. If you enter a value that is already used, an error message will appear. By default, the software displays the next available integer by 10. For example, if the last select list number used is 80, the box displays 90 by default.

Name and number of dependent select list

Displays a list of the possible parent select lists for the new value. The options in this list correspond to the options available in the column immediately to the left of the current select list. For example, if the current select list is **Lining Material**, the values in the drop-down list

are **Not Lined (1)**, **Lined (10)**, and **Undefined (-1)**, as shown in the following illustration:
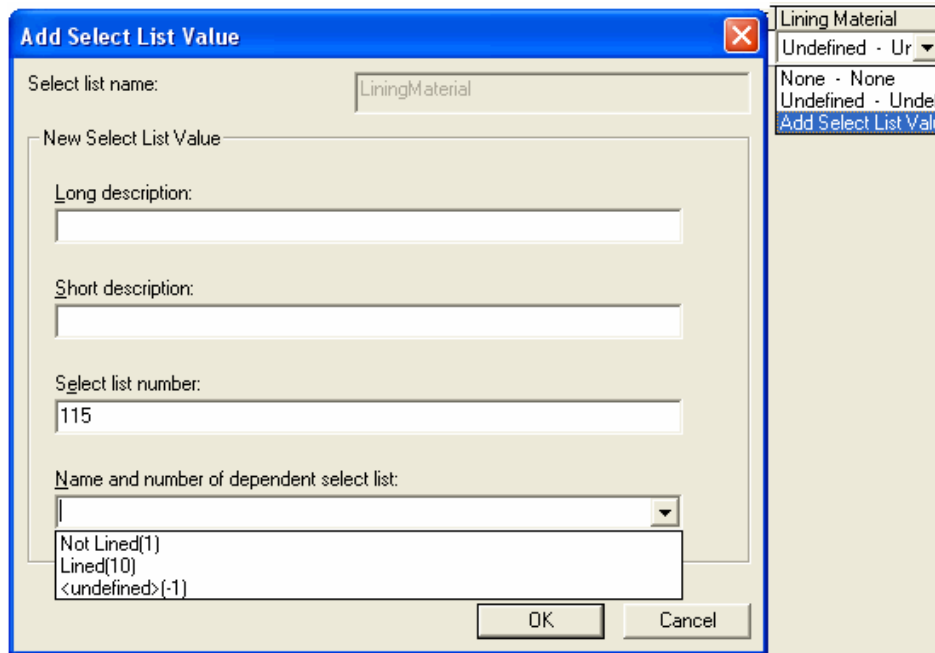
If the current select list is not a hierarchical select list, this option is disabled.

OK

Adds the new select list value to the appropriate database table and displays this value in the select list drop- down list in the editable grid.

Cancel

Closes the dialog box without creating the value.

Options Dialog Box

Provides options for entering and displaying Catalog data.

Piping Catalog Units Tab (Options Dialog Box) **(on page 973)**

Piping Specifications Tab (Options Dialog Box) **(on page 974)**

Piping Specification Units Tab (Options Dialog Box)

Default industry practice

Identifies the default to be used for specification units. Changing this option updates the formats displayed in the associated list view. You can override the default industry practice for individual data types, as necessary. The default industry practice units for the specifications can be different from the catalog units.

Default units of measure for data entry and display

Provides a user interface for reviewing and modifying the units of measure for viewing all other catalog data.

Unit

Lists the types of measures that appear in the catalog, such as distance, angle, volume flow rate, slope, and so on.

Readout

Specifies the units of measure that appear for the associated type of measure. For example, you can display all lengths in meters, while someone else can display all lengths in feet.

Precision

Specifies the number of digits that appear after the decimal point. The range of values is 0-30.

Short Codes Tab (Options Dialog Box) **(on page 976)**

General Catalog Units Tab (Options Dialog Box) **(on page 977)**

Piping Catalog Units Tab (Options Dialog Box)

Default industry practice

Identifies the default to be used for catalog units. Changing this option updates the formats displayed in the associated list view. You can override the default industry practice for individual data types, as necessary. The default industry practice units for the catalog can be different from the piping specification units.

Default units of measure for data entry and display

Provides a user interface for reviewing and modifying the units of measure for viewing all other catalog data.

Unit

Lists the types of measures that appear in the catalog, such as distance, angle, volume flow rate, slope, and so on.

Readout

Specifies the units of measure that appear for the associated type of measure. For example, you can display all lengths in meters, while someone else can display all lengths in feet.

Precision

Specifies the number of digits that appear after the decimal point. The range of values is 0-30.

Piping Specifications Tab (Options Dialog Box)

Defines options that relate to piping specifications.

Default industry practice

Identifies the default to be used for hierarchical select list values when editing piping specifications, such as pressure rating, which is categorized based on industry practice.

Commodity Codes

Include schedule with contractor commodity code

Indicates whether the commodity code in the piping commodity filter is dependent upon schedule for the purposes of editing piping specs. This option is used to determine whether it is necessary to define values for the First Size Schedule and Second Size Schedule properties in the piping commodity filter.

Provide tool for building and selecting codes for

Select whether you want to manually enter commodity codes (set this option to **None**) or you want to use the *Select Commodity Code Dialog Box* (on page 141) to create and select commodity codes (set this option to **Contractor Commodity Code Only**, **Industry Commodity Code Only**, **Both Contractor Commodity Code and Industry Commodity Code**). If you select one of the enabled options, you must define the rules in **Piping > Piping Specification > Model Rules > Commodity Code Rules**. You can load delivered rules to use as a starting point using the **Available rules** and **Load** options on this tab.

Create material descriptions by rule

Select this option to automatically create part material descriptions based on the rules that you define in the **Material Descriptions Rule** node. For more information on defining rules, see *Material Description Rule* (on page 477). This option is not available if the **Provide tool for building and selecting codes for** is set to **None**. The material descriptions are created when you use the **Select Commodity Code** dialog box.

Default Rules

Available rules

Lists the default pipe specification rules that can be bulk-loaded from the delivered workbooks in the catalog database. These workbooks provide a set of default formats, property codes, and material description to begin working with so that you do not have to define these rules from nothing.

The commodity code workbooks are delivered in the [Product Folder]\CatalogData\PDSTranslator\Bin folder and are named Contractor Commodity Code Rule.xls and Industry Commodity Code Rule.xls. Af*ter loading these w*orkbooks, you can edit the information by going to **Piping > Piping Specification > Model Rules > Commodity Code Rules** in the catalog hierarchy. For more information, see *Commodity Code Rules* (on page 467).

Load

Bulk loads the selected rule, in **Available rule**, data from the delivered workbooks into the catalog database.

⚠ **CAUTION** Loading rule data from workbooks will overwrite the existing rule data in the catalog database. This overwriting cannot be undone.

General Options

Verify existence of weight data

Indicates that the specification writer wants the software to verify the existence of weight data in the piping specification. Weight data is seldom used in the 3D model because it is a cost versus benefit issue. Typically, anyone concerned with weight has external methods for accessing that data. Material control uses the 3D model as the source for quantifying the codes within the Material Control system. The weight data is maintained in the Material Control System for shipping purposes. It is considered to be a redundant effort to load the weight data into the Piping Catalog.

Verify symbol placement on save

Indicates that the specification writer wants the software to verify each part referenced by a piping specification before saving to the database. The verification process can be very time consuming. The option is also available on the **Verify Consistency between the Piping Specification and Catalog** dialog box.

Verify long and localized material descriptions on save

Indicates that the specification writer wants the software to verify data automatically on items that can be validated real-time, such as First Size, Second Size, or From/To data. When you enable this option, the software prevents invalid data, such as a string value in a number value cell or data that exceeds known range values, from being entered into a cell. For more information about the other types of verification that occur, see *Check Data Command* (on page 208).

Verify specification data on entry

Indicates that the specification writer wants the software to verify data automatically during entry. When this option is checked, the software prevents you from invalid or incomplete specification data. When this option is not checked, the specification writer must run the **Tools > Verify Consistency Report** command to validate the specification data. For more information, see *Verify Consistency Report Command* (on page 204).

Determine branch size and header size based on

Indicates which method that the specification writer wants the software to use when determining the branch size and header size.

Display standard notes using

Select how you want to display the piping specification standard notes (**Piping > Piping Specification > Notes** in the catalog hierarchy) when editing piping specification in the **Catalog** task. You can display either a numeric value or textural value for the notes. For more information about defining notes, see *Standard Notes* (on page 355).

Piping Specification Units Tab (Options Dialog Box)

Default industry practice

Identifies the default to be used for specification units. Changing this option updates the formats displayed in the associated list view. You can override the default industry practice for individual data types, as necessary. The default industry practice units for the specifications can be different from the catalog units.

Default units of measure for data entry and display

Provides a user interface for reviewing and modifying the units of measure for viewing all other catalog data.

Unit

Lists the types of measures that appear in the catalog, such as distance, angle, volume flow rate, slope, and so on.

Readout

Specifies the units of measure that appear for the associated type of measure. For example, you can display all lengths in meters, while someone else can display all lengths in feet.

Precision

Specifies the number of digits that appear after the decimal point. The range of values is 0-30.

Short Codes Tab (Options Dialog Box)

Short codes rule for piping commodity filters

Provides a user interface for reviewing and modifying the correlation between the allowable values of the Short Code property with the corresponding default values of the Selection Basis property. These rules are only intended for use when editing piping and conduit specifications. When defining a new short code, you must enter a unique value in the **Short Code** column. If the string already exists, the software prompts you to enter a unique short code.

Delete

Removes the selected row from the grid. You can also press the **Delete** key to remove a selected row.

NOTE Short code values that appear on this tab will also appear in the Short Code list when you create piping commodity filter data or conduit filter data. When you begin working with a new catalog, you must come to this dialog box tab and click **OK** to load the short codes so that they are available for use. If you do not do this, the **Short Code** column in the commodity filter will not have any entries.

General Catalog Units Tab (Options Dialog Box)

Allows you to review and modify the units of measure for viewing all non-piping Catalog data. You can click the cells in the **Readout** and **Precision** columns to modify the default value.

Unit

Lists the types of measures that appear in the catalog, such as distance, angle, volume flow rate, slope, and so on.

Readout

Specifies the units of measure that appear for the associated type of measure. For example, you can display all lengths in meters, while someone else can display all lengths in feet.

Precision

Specifies the number of digits that appear after the decimal point. The maximum number allowed is 30.

☰ NOTES

- If the selected **Readout** is fractional rather than decimal, the **Precision** field is disabled. The precision values are not valid with fractional units.

- If the selected **Readout** includes (**fractional**), values will display appropriate fractional measures.

Preview Dialog Box

Displays bitmap image associated with the selected object. You can leave this **Preview** window open as you select different part and part classes.
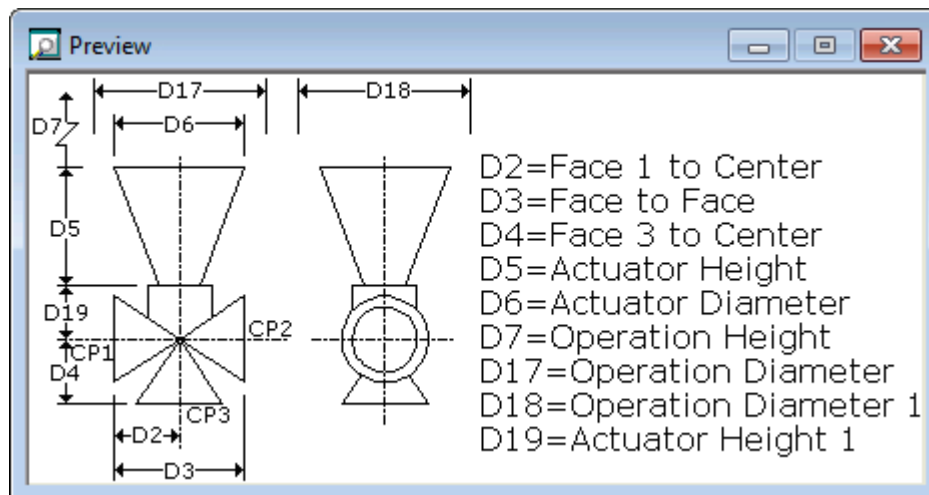
Preview graphics must be added to the reference data before you can view the graphics in the catalog. For more information on defining a graphical preview of a specific part, see "Add a Preview Graphic to Parts" in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

Customize Current View Dialog Box

Defines which property columns to display and in what order.

Available columns

Lists all the property columns in the current view that you do not want to display. To display a column in this list, select the column and then click **Add**.

Selected columns

Lists all property columns in the current view that you do want to display. The sequence that the property columns appear in this list (top to bottom) is the order that the columns appear left to right. To hide a column in this list, select the column and then click **Remove**. Property column names that appear in gray cannot be hidden.

Add

Moves the selected property columns to the **Selected columns** list.

Remove

Moves the selected property columns to the **Available columns** list. You cannot remove property columns whose names appear in gray.

Move Up

Moves the selected property columns up in the **Selected columns** list. The higher in the list, the further to the left the column appears in the view.

Move Down

Moves the selected property columns down in the **Selected columns** list. The lower in the list, the further to the right the column appears in the view.

Copy Filters from Catalog Dialog Box

Sets options for specifying the source Catalog database from which filters are copied to the current active Catalog database.

Provider type

Allows you to specify the data management system type, SQL Server or Oracle.

Database

Specifies the residing SQL Server location or Oracle net service connection and database name for the Catalog database from which you want to copy filters.

SQL Server or Service Name for Oracle

Depending on the data management system type, specifies one of the following: For SQL Server databases, specifies the name of the server on which the Catalog database you are copying from resides. For Oracle databases, specifies the name of the Oracle net service connection for the Catalog database from which you are copying.

Database or Schema name for Oracle

Allows you to specify the name of the Catalog database from which you want to copy filters.

Metadata

Specifies the residing SQL Server location or Oracle net service connection and database name for the Catalog schema database from which you want to copy filters.

SQL Server or Service Name for Oracle

Depending on the data management system type, specifies one of the following: For SQL Server databases, specifies the name of the server on which the Catalog database you are copying from resides. For Oracle databases, specifies the name of the Oracle net service connection for the Catalog database from which you are copying.

Database or Schema Name for Oracle

Specifies the name of the Catalog schema database from which you want to copy filters.

Select Commodity Code Dialog Box

Used to create contractor and industry commodity codes interactively by selecting the part properties.

To make this dialog box available, you must go to **Tools > Options**, select the **Piping Specifications** tab, and then set **Provide tools for building and selecting code for** to one of the enabled options. You also must define the default rules in **Piping > Piping Specification > Model Rules > Commodity Code Rules** (in the catalog hierarchy). You can load default rules to use as a starting point using the **Available rules** and **Load** options on the **Piping Specifications** tab of the **Options** dialog box.

After all the rules are defined and you have enabled the option, anywhere you are required to enter a commodity code in the grid view, select **Select Commodity Code...** from the drop-down list to activate this dialog box.

Commodity type

Select the commodity type for which to build the commodity code. You must select something from this list first.

Method

Select how you want to build the code. You must start with the **Build code from part properties** method and select at least one property before you can use the **Choose code from available parts** method. After that, you can alternate between the two methods as needed.

- **Build code from part properties** - Builds the commodity code by the properties that you select in the **Part properties** list.

- **Choose code from available parts** - Displays a list of available parts based on what you have selected in the **Part properties** list using the **Build code from part properties** method.

Part properties

Displays the commodity type properties that you use to define the commodity code. By selecting a value for a property, the software adds that value's code to the commodity code. You can change what displays here by editing the default rules in **Piping > Piping Specification > Model Rules > Commodity Code Rules** (in the catalog hierarchy).

Commodity codes

Displays all available commodity code that you can select from based on what you have selected so far in the **Part properties** list. This field only displays when **Method** is set to **Choose code from available parts**.

Commodity code

Displays the commodity code as you build it. This option is read-only.

Material description

Displays the material description as you select part properties. This option is read-only. You must select the **Create material description by rule** option on the **Piping Specifications** tab of the **Options** dialog box to have the software create the material description. Otherwise, this option remains blank.

Add Range Dialog Box

Adds a new node under the Branch Table, Reinforcing Weld Data, and Reinforcing Pad Data nodes in the Catalog tree view.
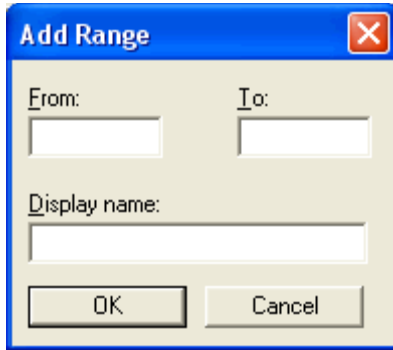
From

Type the starting angle in the range. For example, you can type 44.5 degrees.

To

Type the ending angle for the range. For example, you type 45.5 degrees

Display Name

Specify a name that identifies the range in the Catalog tree view. For example, you can type 45-90 degrees.

OK

Saves the changes to the database, and adds the node to the Catalog tree view. When the node is selected, an empty branch table displays in the grid view so that you can enter the new data.

Cancel

Closes the Add Range dialog box without making any changes.

Glossary

abstract part

A part that is only defined by a partial specification and that cannot be materially provided by the organization that defines the specification.

Active Template Library (ATL)

Set of class templates and wizards supplied with Microsoft C++ Version 5.0 and later. You can use an ATL when you create ActiveX controls and any other type of object that uses the Component Object Model (COM) model. Using an ATL is generally preferred over Microsoft Foundation Classes (MFC), because the implementations are smaller, easier to use, and more closely tied to the COM model.

angle

The circular measurement taken from the intersection of two pipes at a turn or branch.

approval state

Recorded state of acceptance of information contained in objects within the database. The approval states indicate a level of confidence in the information stored in the database and govern your ability to alter specific data about a product.

arrangement (accommodation)

Those components of a system arranged in three-dimensional space with accurate dimensional representation for installation. Various types include electrical, HVAC, machinery, outfitting, and piping.

attribute

A single type of non-graphics information that is stored about an object such as diameter or end preparation.

axis

An imaginary line used to define the orientation of a system or object normally defined in terms of an x-, y-, and z-axis. Some 3-D graphic objects have an associated axis used to define the center or axis for rotations.

basic design

Engineering definition of the model and its systems.

bill of material (BOM)

Hierarchical decomposition of a product into constituent assemblies and parts. Specific types of BOMs exist (for example, an EBOM is a bill of material from the point of view of an engineering department; an MBOM is a bill of material from the point of view of manufacturing).

bulkload

The process by which reference data in Microsoft Excel workbooks is loaded into the Catalog database.

catalog

Repository of information about components and materials used in construction. When you use catalog parts in the model, the software places an occurrence of the catalog part in the project. This occurrence is a copy of the actual catalog part.

Catalog database

The database that contains the reference data. Each model database can reference a different Catalog database.

chain

A set of continuous and tangent segments.

change history

Process of recording information such as who, when, and why for any given modification.

change management

Software features or manual procedures for managing the consequence of change. For example, software can support a change management feature to report drawings that need updating as a result of a change in a 3-D model.

change propagation

Ability of the software to intelligently modify dependent design information to reflect change in a higher order object.

class

Grouping of individual objects that share some very significant, common characteristics.

classification folder

A folder in the Catalog hierarchy that contains part classes. Classification folders are one level above part classes. The ClassNodeType and R-ClassNodeDescribes sheets in the Microsoft Excel workbooks define the classification folders.

codelist

A set of acceptable values for a particular property that can be referred to by an index number or selected in a combo box. For example, the codelist for the material specification allows you to select from a set of standard entries, such as ASTM A183-F316 Stainless Steel.

commodity code

A user-defined code that provides an index to parts in a catalog.

commodity item

A standard component found in a manufacturer catalog (an off-the-shelf component).

component

Physical part that a feature generates.

concurrent access

Ability of the software to allow multiple users to simultaneously access and modify the design of a model.

consolidated tasks

A collection of tasks run in batch. For example, the software allows you to extract a set of drawings immediately or to schedule the batch extraction for a future time.

constraints

A logical restriction that controls how part symbols ports relate to each other and to reference ports. There are four constraints: parallel, perpendicular, coincident, and distance.

contract

A Work Breakdown Structure object representing a scope of work, usually performed by an external supplier. The contract is related to a project and appears in the Work Breakdown Structure hierarchy.

coordinate

The location of a point along the X-, Y-, or Z-axis.

coordinate system

A geometric relation used to denote the location of points in the model. The most common coordinate system is the rectangular coordinate system, whereby points are located by traversing the X-, Y-, and Z-axes of the model. Normally, coordinate systems have their origin defined as 0,0,0.

cutting plane

A plane that cuts through an object.

damage records

Data relating to the damage and repair of structure or components that occurred during or after construction of a plant.

data interchange

Capability to output the design, or portions of the design, in a standard format for use or movement to another computer software system.

database

Repository for the product model data. The database contains information to describe individual objects in the data model and the relationships between objects as appropriate.

database backup

Process of recording a backup copy of the complete database or the incremental changes after the date that the last complete copy was created.

database break and recovery

Utilities used to restore a database after files are corrupted.

database copy

Functionality to copy large collections of model objects from one design project to another design project.

database management

Functionality related to managing a product model database.

database monitor record

Transactions that occur in order to provide database (DB) recovery after a stop in response with a minimum of lost data.

degree

The highest polynomial factor in the curve or surface mathematical definition. A line is a degree 1 curve, while a cubic B-spline is a degree 3 curve.

design alternative

Difference in a design represented by a separate version. A design alternative can be a new design prepared as a proposed change, or one of several elective options that the builder or customer selects. Each design alternative has an identification assigned so you can uniquely refer to the design alternatives.

design approval log

Record of review and approval of parts of the design.

design data auto input

Automation in loading existing design data into a new design database.

design documents

Drawings, sketches, material lists, procedures, and so forth that are generated during the design phase.

design object

Any object with properties that you can select. A design object can be related to one or more contracts of different types, but related only to one contract of a given type.

design progress check

Analysis of the content of the design to some metric unit that gives an idea of the degree of completion.

design review

Functionality to support rapid viewing of the design and markup of features with comments.

design service

Any general system services related to the design function.

design standard

Feature or object used in plant design that has been determined to the normal or approved way of accomplishing a design requirement. In the context of computer software, the term refers to computer functionality to support standards, not the standard itself.

detail schedule

Lowest level of schedule used to manage and track work progress.

distributed systems

Systems consisting of sequential parts with a distributive characteristic (for example, pipes distribute fluids, HVAC distributes air, cabling distributes power, and structure distributes loads).

distribution systems

Term synonymous and used interchangeably with the term distributed systems.

documentation

Drawings and other records that you must produce to document, obtain approval, or build the design.

drawing tool

Tool that helps in the process of creating, modifying, or manipulating objects. Examples are PinPoint and SmartSketch.

easting

A term that describes an east coordinate location in a coordinate system.

edge

A topological object that represents a trimmed curve bounded by a start and end vertex.

edge distance

The distance from the center of a bolt or rivet to the edge of a plate or flange.

equipment catalog

Catalog of equipment geometry and limited properties that the software uses to identify and visualize equipment and its placement in the model. The catalog is not the source for the total specification and ordering data for the object.

fabricate

To cut, punch, and sub-assemble members in the shop.

face-to-face

The overall length of a component from the inlet face to the outlet face.

fasteners

Bolts and rivets used to connect structural members.

element

Primitive geometric shape such as a line, circle, or arc.

fence

Boundary or barrier that separates or closes off an area. To surround or close like a fence.

field adjustment

Material added to the neat design geometry of piping or structural parts to allow for fit up in the case that extra material is required due to uncontrolled variance in the manufacturing and construction process.

flavor

A different variation of a symbol. Each variation has different occurrence property values.

focus of rotation

A point or line about which an object or view turns.

full penetration weld

A type of weld in which the weld material extends through the complete thickness of the components being joined.

function points

Part of the requirements documentation, function points are the smallest granularity of a requirement statement that describe specific detailed actions that the software performs.

functional block diagram

Schematic representation of a system (piping, electrical, ventilation) showing system parts and their relationship. You use symbols to represent equipment and components. A connecting network of lines illustrates their relationship. Taken together, the symbols and the network illustrate the function of the system.

furnishings

Parts such as movable articles and fittings that normally are not associated with a system (for example, a chair).

generic specific

Object that is parametrically defined or defined to suit a family of specific parts (for example, International Standards parametrics). For example, a 100 - 200 gpm pump in the catalog can provide a general shape to appear in the model until a specific object has been identified. See also specific and specific object.

GUIDs

Acronym that stands for Globally Unique Identifiers. The software automatically creates the GUIDs sheet in the Excel workbooks when you create the Catalog database and schema. The purpose of storing GUIDs within Excel workbooks is to help you keep track of what has been loaded into the database. Storing GUIDs also helps to avoid the situation in which a replacement Catalog database causes existing models to become invalid.

host location

The first location created for a Site. This host location is defined when the Database Wizard creates the Site database.

host server

The database server on which the Site database was created using the Database Wizard. Alternatively, if it is a restored database set, the Host Server is the database server where the Site database is restored. The Host Server in a Workshare environment contains the origin for the Site, Site Schema, Catalog, and Catalog Schema databases. Consequently, most Project Management and reference data work must take place at the Host.

initial design

Early stage of design work, generally before contract, used to estimate construction costs and provide a rough concept of the intended plant. Contains information relating to a plant created during its initial (concept) design period.

initial structural plan

Principal structural plan for the plant; also called a construction profile.

instantiation

Occurrence of a catalog object at a specific geometric location in the model.

interference checking

A process that identifies possible collisions or insufficient clearance between objects in the model.

job order

Industrial authorization for accomplishing work; synonymous with a work order.

kinematics analysis

Analysis of mechanical motion.

ksi

Kips per square inch.

leg length analysis

Preferred term is welding length analysis.

library

Resource of reference information that you can access in developing a plant design.

life cycle database

Information developed to assist in the maintenance and modernization of delivered plants.

link

Way to store information about another file in your document. You can update a link so that changes in the file appear in your document.

lintel

A horizontal member used to carry a wall over an opening.

load group

A grouping in which all components feature uniform load limits and stress safety characteristics. For example, if a pipe clamp from load group 5 has a maximum nominal load of 20kN, then so does a threaded rod from load group 5.

location

A Location is defined by three user-defined inputs: 1) a unique name, 2) a unique name rule ID, and 3) the server where the Site databases reside for that Location. A Location is defined and created when the Site database is created using the Database Wizard. Additional Locations can be created in the Project Management task. Each Location is a Site-level object, thus other Plants within the same Site collection can use the Locations when the Plants are configured for Workshare.

logical member

An object in the model used to represent the design topology.

machinery

Major pieces of equipment installed in a plant.

macro

A sequence of actions or commands that can be named and stored. When you run the macro, the software performs the actions or runs the commands. You can create the macros in Visual Basic or other OLE-aware programming applications. Some of the other OLE-aware programming applications are Visual Basic for Applications, Visual C++, and so forth.

maintenance envelope

A rectangular box around the part for clearance during maintenance operations.

maintenance records

Records of breakdown, repair, and overhaul of equipment.

material analysis

Analysis of a completed design work for extracting detailed material requirements; also called material lists.

material list

An option category that controls the format and content of the bill of materials.

methods

Objects in the database that describe the manufacturing methods to the component parts of a plant.

move from point

Starting point for an action. For example, when you move an equipment object, the Move From point determines the point of origin for the move.

move to point

Ending point for an action. For example, when you move an equipment object, the Move To point determines where you want the move to stop.

MTO neutral file

A non-graphic output file that can be fed into a material control system. MTO stands for Material Take-Off.

node

- One of the set of discrete points in a flow graph.

- A terminal of any branch of a network or a terminal common to two or more branches of a network.

- An end point of any branch or a network or graph, or a junction common to two or more branches.

northing

A term that describes a north coordinate location in a coordinate system.

nozzle

A piping connection point to a piece of equipment.

nozzle standout

The shortest allowable distance between the connection point of a nozzle and the start point of a turn on the leg connected to the nozzle.

NPD (Nominal Piping Diameter)

The diameter of a pipe.

object

A type of data other than the native graphic format of the application.

occurrence (of part or equipment)

Instantiation of a part of equipment in the model that refers to the part library; an instance of a specific object. The design can be built several times, and therefore the occurrence can apply to more than one hull. Typically, an occurrence points back to a specific object, either for its complete definition, as in the case of a particular valve, or for its made from material, as in the case of a steel plate part cut from sheets. Thus, when a designer selects a component from the catalog and places it at a location in the space of the plant, the software creates an occurrence of that object in the plant design.

occurrence property

A characteristic that applies to an individual object in the model. Occurrence properties are designated with 'oa:' in the reference data workbooks. You can view and modify occurrence properties on the Occurrence tab of the properties dialog boxes in the software. Depending on the object, some occurrence properties are read-only.

origin

In coordinate geometry, the point where the X-, Y-, and Z-axes intersect.

origin point

The point at which the coordinate system is placed, providing a full Cartesian coordinate system with positive and negative quadrants. Points are placed at coordinates relative to the origin point, represented by the X, Y, and Z values.

orthogonal

The characteristic of an element consisting completely of elements positioned at 90-degree angles. A square is an orthogonal element.

orthographic

A depiction of an object created by projecting its features onto a plane along lines perpendicular to the plane.

P&ID

Diagram that shows the topology, functional components, and special requirements of a piping system; generally represents the engineering design of the system.

package

Set of closely related classes. (UML)

painting

Computation of paint surface and recording of paint system requirements.

parameter

A property whose value determines the characteristics or behavior of something.

part class

A group of similar objects. You can define part classes in the Excel workbooks. A part class can have multiple parts. For example, a heat exchanger part class can contain heat exchangers with different dimensions.

part number

Unique identifier of a part.

PDS (Plant Design System)

A comprehensive, intelligent, computer-aided design and engineering application for the process, power, and marine industries. PDS consists of integrated 2-D and 3-D modules that correspond to engineering tasks in the design workflow.

PinPoint

Tool that allows you to place, move, and modify elements with precision, relative to a reference point.

principle of superposition

The principle that states that the stresses, strains, and displacements due to different forces can be combined. This principle is only valid for linear analysis.

Product Data Management (PDM) System

Software intended to manage both product data and documents associated to the product data. Functionality typically includes: object-based data modeling tools, user administration, business rules, and document management. Document management typically includes document editing or reviewing, document mark-up or redline, document storage, and full-text retrieval.

product structure

Hierarchical breakdown or decomposition of a product into constituent parts, volumes, or units. (For example, a bill of material is one possible type of product structure.)

production planning

Functionality associated with the work breakdown and sequence of the construction of a plant.

promotion

Process of associating approval state with a product version. A product version begins its existence at a working approval state. When the version is at some level of maturity, its approval state is elevated to a higher approval state (that is, promoted). Then, further changes must be carefully controlled and generally require the data set demoted to a working state. One or more promotions can occur successively higher approval states (between working and approved) to represent various intermediate levels of review or progressive approval.

query select sets

Set of objects that are selected in a query or queries on the database.

reference data

The data that is necessary to design plants or ships using the software. Reference data includes graphical information, such as symbols. It also contains tabular information, such as physical dimensions and piping specifications.

resource estimation

Rough estimate of material, manpower, and facility utilization for the design and construction of the plant.

route

1) A line connecting a series of points in space and constituting a proposed or traveled route. 2) The set of links and junctions joined in series to establish a connection.

satellite server

The database server where the replicated databases reside for Workshare. The Satellite Server is not used unless Workshare is activated.

schema

A database that creates the structure of another database. For example, a schema specifies the queries, tables, fields, and data types in a database.

schema update utility

Functionality used to assist in processing existing product models to an updated database structure after you modify or add to the database structure.

site

The top level in the Project Management hierarchy. A Site configuration may contain several Catalogs, each shared by multiple Plants.

site administrator

Person responsible for managing the standards and general parameters for a given plant site within a Site database.

site setup

Functionality associated with establishing a new plant site or hull for design development.

sketch and trace

User interface for rough definition of a required design feature that typically works in a 2-D mode.

specifications

Contracted requirements for the plant.

stud

A bolt, threaded on both ends, used to connect components.

suspended floor

A concrete floor system built above and off the ground.

symmetric node

Type of vertex on a curve. A curve with a symmetric node has the same curvature on each side of the node. A handle can be attached to a symmetric node for editing.

system

A conceptual design grouping that organizes parts in hierarchical relationships. A system represents a functional view of the model and includes information such as system name, type, properties, and design specifications for the objects assigned to the system.

tag number

User-specific, unique number assigned to an object (for example, CV-101 for a control valve, HE-2002 for a heat exchanger).

target point

The origin for coordinate measurements displayed by PinPoint. You can position the target point anywhere on the drawing sheet or view.

tolerant geometry

A type of ACIS geometry - either an edge or a vertex - that is outside the tolerance for ACIS and requires special handling.

trimmed surface

A surface whose boundary is fully or partially inside the "natural" geometric definition of the surface. Some or the entire control polygon extends outside the face boundary.

trunk

Feature that quickly reserves space for the distributive systems and other systems that have a path. Along the trunk are stations that define the cross section and identify part or system membership.

unit/module modeler

Facility of the system to structure collections of equipment and components into a single identifiable object.

user attributes

A customized property in the reference data. The Custom Interfaces sheets in the Excel workbooks define these properties. You can list the customized properties on the individual part class sheets.

version control

Ability of the system to manage multiple versions of a single part of the design. Version control should support conditional analysis and promotion status, as well as alternate design features among hulls within a plant site.

vertex

A topological object that represents a point in the three-dimensional model.

viewset

Set of objects (usually a subset of the entire database) that a view operation uses. Membership or lack of membership for any object in a viewset does not affect the actual stored representation of the object, but only its availability or desirability for viewing in the current scenario.

weight and CG analysis

Routines that compute the weight of commodity materials as configured in a given design (for example, plate and pipe) and determine total weight and center of gravity (CG) for a collection of material and equipment, as well as the complete plant.

welding

Weld requirements for joining materials. Welding length analysis is the calculation of required weld dimensions; also called leg length analysis.

wirebody

A topological object that represents a collection of edges jointed at their common endpoints.

wizard

Software routine attached to an application that provides guidance and expert help to you to complete one of the functionalities of the application.

work content

Estimation development of metrics from the database that relates to the work hour content of the various construction units.

work order

Plant authorization for completing work; synonymous with a job order.

working plane

The available 2-D plane of movement for endpoint selection.

workset

Set of objects (usually a subset of the entire database) used in an interactive change, add, or delete operation. Membership or lack of membership for any object in a workset does not necessarily affect the actual stored representation of an object. However, you can change or delete an object in a workset that also results in a change or deletion of the stored object. Similarly, when you add a new object (not currently stored) to a workset, the software also adds the object container.

workspace

Area that represents the portion of the model data needed to perform the intended task and includes the user modeling settings.

workspace document

Document into which you can extract a portion of the model data for a user task.

Workspace Explorer

Tree or list representation of objects in your workspace.

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